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ABSTRACT

The paper id divided into five parts, introduced by the research rationale and a definition of the DACUM (Designing a Curriculum) approach to curriculum, learning, and evaluation in occupational training. As a process, DACUM is a group-accomplished occupational subject area skills analysis; as a product, it is a graphic representation of those skills, called a DACUM chart, which can be used as a curriculum plan. Part 1 of the paper reviews the current literature on task analysis techniques used for systematic curriculum development. Part 2 describes the ways DACUM is being used, and Part 3 is the DACUM procedures manual, for coordinators leading groups in developing DACUM charts (skills profiles). Part 4 is a 142-page collection of terminal performance objectives drawn from completed DACUM charts, classified into 24 general areas according to the Canadian Classifications and Dictionary of Occupations. Part 5 presents conclusions and implications: DACUM provides a means of building a large data base of instructional objectives, a necessary element for a highly flexible, computer-managed instructional system close to the open college concept. An epilog contains comments and additional ideas. Appended are several pages of charts and diagrams related to the DACUM skills analysis process. (Author/AJ)

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THE APPLICATION OF DACUM IN RETRAINING AND POST - SECONDARY CURRICULUM DEVELOPMENT

REVISED SECOND EDITION - JAN 1976

(FIRST EDITION - AUGUST 1974)

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THE APPLICATION OF DACUM IN RETRAINING

AND POST-SECONDARY CURRICULUM DEVELOPMENT

PREFACE TO THE FIRST EDITION

The paper is divided into Parts which will hopefully be more useful as separate units congruent with specific interests and needs.

The primary target audience for this whole paper is the curriculum/staff developer or administrator who is primarily concerned with WHAT is to be learned.

The paper consists of the following parts:

The Introduction defines DACUM as it is used by this author. It outlines the rationale for doing the research from an interprovincial, provincial and local point of view.

Part I - A review of some current literature dealing with front-end analysis may be useful to developers and instructors engaged in systems approaches to curriculum development. This review serves as a base for putting DACUM into perspective and a way of projecting and predicting how it will evolve.

Part II - This section deals with the different ways in which the processes and products of DACUM are being used and implemented in different places. It is important to keep these differences in mind when reviewing the various charts.

Part III - The DACUM Procedures Manual is a "How To" booklet. Reference will be made to materials already prepared by the author to (a) introduce the idea to any new group and (b) begin training coordinators to actually carry out the process.

Part IV - This section consists of a collection of DACUM chart information (not the actual charts) classified by subject or job designations and in small format so that the user can easily build a card file from it, make his or her own references, add to, make notes, obtain copies of the actual charts and further build the file, etc.

Part V - Implications and Conclusions will deal with advantages, disadvantages and some recommendations for future use, as well as a little "Crystal ball gazing".

Epilogue - The second edition contains comments and additional ideas from Gordon Wright, Past Director of the College Bibliocentre and Robert Adams, author of the original work on DACUM.

The Bibliography and References will include names of people who made contributions to the information on the use of DACUM and/or actual charts. It is hoped that this list will form the beginning of an information network with Humber College - Lakeshore Campus in Toronto as the collecting and distributing agency.

Some of this work, since April 1975 has been supported by Project ARISTOTLE * a Federal Department of Manpower and Immigration Training Improvement Plan (TIP) grant to the Ontario Ministry of Colleges and Universities in conjunction with the Colleges of Applied Arts & Technology. The charts will form a data base from which programs in Colleges and Retraining Centres can draw for Program Development.

* ARISTOTLE is an acronym for "Automated Retrieval Information System to Track and Optimize the Training-Learning Environment"

THE APPLICATION OF DACUM IN RETRAINING AND POST-SECONDARY CURRICULUM DEVELOPMENT

PREFACE TO THE SECOND EDITION

NOVEMBER, 1974

The enthusiastic response to the first edition may indicate that there is a need for DACUM or at least for information about it.

Many requests have been received as well as additional charts and comments. Before printing again it seemed useful to try to include the new charts in the system and to pass on some of the comments.

A series of Job Corps curriculum outlines for a wide variety of occupational areas was collected over the last few years. Since the format and approach of these materials are closely aligned with the DACUM approach, it seemed to make sense to include them in the growing collection. Each Job Corps curriculum outline was summarized into a set of Terminal Performance Objectives - these have been listed and included in Part IV. Humber College will have copies of the expanded outlines for those interested in these occupational curricula.

A page of photographs was included in Part III to help readers visualize the DACUM process.

The classification and coding of charts in this growing document needs additional work. One starts out with the best of intentions, trying to keep things simple - HOWEVER - as the collection grows so does the complexity of the problem. CCDO is still the basis for classifying but,

matching chart titles - to occupational groups - to a meaningful set of categories and codes has probably created some confusion. Perhaps the 3rd edition (if there is one) will tackle this time consuming problem.

The Epilogue contains comments on the first edition including a proposal from Mr. Gordon Wright, Past Director of the College Bibliocentre - on how to deal with the coding system.

The author expresses his appreciation once more to Bob Adams for his comments, suggestions and additional chart sources and contacts. Bob's book DACUM Approach to Curriculum Learning and Evaluation in Occupational Training as footnoted on the first page of the Introduction is available upon request, free of charge from:

Technical Services Publications Division
Department of Regional and Economic Expansion,
161 Laurier Ave. West,
Ottawa, Ontario

Bob Adam's comments are summarized in the Epilogue. He has made a valuable suggestion with respect to a program development grid for implementing charts. He has prepared an excellent set of audio tapes for DACUM coordinators.

It is hoped that this second edition will help to meet the apparent need for viable curriculum development techniques. It should be mentioned again that DACUM, in whatever context it is understood or used is only a TOOL - a means to an end and as a tool it should be flexible and capable of changing and evolving as it is used. The end, needless to say, is our common goal as educators - efficacious student achievement of educational and training goals and objectives.

INTRODUCTION

Definition of DACUM (as used by the author)

DACUM is an acronym for Developing a Curriculum or Designing a Curriculum. It is considered to be both a process and a product.

As a product it is one or two sheets of paper showing a skill profile for a job or subject area which can serve as a curriculum outline or plan. This graphic outline presents small blocks, each containing a short behavioural or action-oriented definition, which make up a complete picture of the required skills or abilities within a particular field of human endeavour.(1) Definitions are usually arranged with the simplest tasks on the left and the most complex on the far right.

As a process it is a dynamic group analysis of a particular job or subject area. It is this group process, under the leadership of a competent co-ordinator, which produces the range of skills found in the graphic DACUM chart.(2)

PURPOSE OF THIS PAPER

An expansion and clarification of DACUM is needed at this point because there is a variety of processes and products emerging, all under the name of DACUM. If the various adaptations and uses of the concept are understood, then curriculum developers right across

[1] See sample DACUM charts, Appendix A

[2] R.F. Adams, DACUM Approach to Curriculum, Learning, and Evaluation in Occupational Training. (Yarmouth, Nova Scotia: Nova Scotia New Start Corporation, March, 1972), p. 24.
See also: Overview Part III of this paper

the country will be able to make better use of existing materials and perhaps start communicating for their mutual benefits.

A collection of DACUM charts has been started and an exchange system proposed. The College Bibliocentre has shown interest in setting up this system, which could be available to all curriculum and instructional developers.

RATIONALE

1. Most provinces have set up community college and/or adult training institutions. Although autonomous effort may be needed to develop the original skills and competencies in curriculum work, it may be time now to begin economizing on the efforts in this area. The high mobility of graduates would seem to point toward more commonly acceptable standards of achievement and performance.

Support for this point can be taken from the enthusiastic response encountered in the seven Provinces contacted for information and charts.(3)

2. The Ministry of Colleges and Universities for Ontario has recently formed two major branches, the Ontario Manpower Training Branch (MTB) and the College Affairs Branch (CAB). From a curriculum standpoint the MTB deals with all publicly funded Training programs while the CAB deals with Post-Secondary programs.

By Training programs is meant Employer Centered and Institutional Centered training. This includes apprenticeship.

[3] See list of contributors in Bibliography

The MTB, as perceived by this author, has taken a co-ordinating rather than a leadership role in curriculum development. There is a need for a quick, relevant, standard way to develop training programs. This technique should not only apply to new programs, but to review existing ones as well. If a standard method were developed then communications between various committees, employers, training institutions and government agencies would be improved.

3. Such a technique should be capable of:

(a) being completed quickly and economically;

(b) involving and including the needs of business and industry;

(c) being represented graphically so that a comprehensive overview of the program is possible on a one or two page format (or a single sheet of michrofiche or 35 mm. film);

(d) being behavioural rather than content oriented (employers seem to be able to agree on what has to be done, but have difficulty agreeing on what has to be known);

(e) setting out a skill profile for a complete set of tasks rather than building vertical subject oriented courses (we have had such programs for years and many complaints about the inability of graduates to "do" anything);

(f) involving the best people in the field with knowledge of future requirements in order to minimize retraining (this includes "learning how to learn");

(g) interpreting and translating the real world into terms that training and educational institutions can build upon and refer to.

4. Apprenticeship training curriculum and standards have been dealt with by the Industrial Training Branch (ITB) for several years. They were part of the Ontario Department of Labour, but are now integrated with the MTB. The ITB has been developing a MODULAR approach to apprenticeship training which uses task analysis and unitization (breaking into small instructional blocks) as procedures as well as performance objectives as a way of setting measurable standards.

An enormous amount of work has been done in the past by ITB and now the MTB (and the colleges) are looking for a way to integrate the ITB's efforts with the present development work taking place in retraining (and post-secondary).

5. As a Manpower policy for training in Ontario takes shape, it is evident that job clustering and skill profile concepts will become necessary. It is also evident that some form of electronic data processing will have to be used to bank tasks, skills, job profiles, labour force profiles, pre-requisites, co-requisites, training needs, etc.

One small step in this direction (a goal for Ontario in this decade) would be a common language and format for describing and developing programs.(4)

6. Newly organized colleges (such as the Lakeshore Campus of Humber College) will need some organizing frame factors for curriculum which will allow them to become computer managed and highly flexible. The shift in organization within the CAAT (Colleges of Applied Arts and Technology) system is toward the learner and

[4] For Points 2 to 5 see Report on "Training for Ontario's Future", by Dr. Dymond (Chairman) and others. Information Canada, April, 1974.

community involvement rather than to the administrative convenience of the institution.(5)

[5]For Point 6 see:(a) Report from "Commission on Post-Secondary Education in Ontario", by D. Wright (Chairman) and others. Toronto, Queen's Printer, 1972. (b) Report of "Task Force on the Integration of Full and Part-time Studies", by V. Baterstelli (Chairman) and others. Toronto, Ontario Humber College, May, 1974.

PART I

REVIEW OF SOME CURRENT LITERATURE DEALING WITH FRONT-END ANALYSIS

Since DACUM (as defined by the author) deals primarily with the WHAT of curriculum as opposed to the HOW, then a quick overview of some current literature dealing with so-called "front-end" or task analysis techniques used for systematic curriculum development will be useful for putting DACUM in perspective. A look at methods of curriculum development might also help focus analysis procedures and subsequently the DACUM approach.

James O'Hanlon, in his brief article, Three Models for the Curriculum Development Process[1] gives a summary of the field. He calls the three models "Management, Systematic and Open-Access".[2]

The management model is perhaps the most familiar. The process itself follows the management hierarchy within the institution. The ultimate decisions are made at the top. Proposals are fed in at the teacher, supervisor and curriculum committee levels and are then screened by various levels of management. Control is maintained by the administrator with the final authority through the careful allocation of scarce resources. Evaluation is done by subjective methods, comparing achievement to standarized test scores, gathering informal comments and following up graduates.

1 James O'Hanlon, "Three Models for the Curriculum Development Process", Curriculum Theory Network Vol. 4, No. 1, 1973-74, 64-71

2 Ibid., p. 64

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The chief characteristics of the management model are the instructor/administrator originated nature of the content and the control of resources by management to ensure that the program of study is followed.

The systematic model is goal oriented. The purpose or aim of the curriculum is established first. Decisions regarding its development are governed only by the purpose and hence persons other than management should, in theory, be involved.

The tasks are carefully sequenced and each stage is evaluated in terms of whether it is furthering the original aims. The guidelines for this type of curriculum are usually quite specific and are filtered not by management, but by educational philosophy and psychology. Control is maintained by adherence to the original purpose and guidelines derived from that purpose. Resources are only allocated on the grounds that they help achieve the stated learning goals. Evaluation is based upon the same principle with feed-forward and feedback from each successive stage used for checking.

The chief characteristics of the systematic model are its goal or purpose oriented character and the need for involvement from many areas of the community and the institution to achieve the stated goals.

The open-access model is based upon the humanist tradition in philosophy. Decisions are made with respect to their congruence

to the original humanist rationale. Discourse, openness and discussion are the methods used. Decentralization of decision-making results from openness to all ideas. A decision can be reconsidered at any time and no preconceived plan is required before an idea is implemented. After due consideration statements are formulated which act as guides for those who are responsible for developing and constructing learning experiences. The process is one of continuous experiment. Evaluation is in terms of the humanist rationale which was judged significant in terms of humanistic values.

Its chief characteristics are its humanistic approach and its openness to interpretation based on considered human values. Control of the process is assumed within the framework of rationality and collective interpretations of changing human needs.

O'Hanlon[3] goes on to make the point that these three models may not be as different as they appear. Perhaps they are just different levels of sophistication for the same process. DACUM seems to fit into the systematic model although modified forms of its dynamic, group brainstorming techniques may be used within the framework of any one of the models described. The point here is that perhaps O'Hanlon's idea will give us an insight with respect to the direction the DACUM process is taking.

Assuming that DACUM is primarily an element or function of a systematic approach to curriculum development, then it might be best characterised as a kind of "task analysis". A number of systems models for the development of instruction have been set out by

3 O'Hanlon, op. cit., p. 70.

Paul Twelker, et al[4] in The Systematic Development of Instruction. He gives us five different models based on major research projects; all of them involve defining the problem in some way.

Twelker analyses the five models into three stages, Define, Develop and Evaluate. He breaks "Define" into Identify the Problem, Analyse the Setting and Determine Management Organization.

Leonard Silvern[5] in his course on Designing Education and Training Systems stresses what he calls the JAHAA (Job Analysis, Human Activity Analysis). This, he contends, is the first activity which must be done in setting up a training or educational system.

It is interesting to note that Silvern defines (or rather explains) analysis as[6]:

1. Identify the whole piece of information.
2. Identify the parts of the whole.
3. Relate the parts to each other.
4. Relate the parts to the whole.
5. Separate the parts.
6. Limit by halting the process.

These steps are an accurate description of exactly what happens during a DACUM session.

Twelker appears to be saying the same thing as Silvern, except in a different way. The sphere of human activity or

[4] Paul A. Twelker and others, The Systematic Development of Instruction: An Overview and Basic Guide to the Literature (Stanford, California: ERIC Clearinghouse, March, 1972.

[5] Leonard C. Silvern, Designing Education and Training Systems a 6 day course using analysis, synthesis, modeling and simulation as systems procedures and LOGOS as a graphic language to describe the systems.

[6] Leonard C. Silvern, Systems Engineering Applied to Training (Houston. Texas: Gulf Publishing Company, 1972), p. 58.

endeavour has to be taken apart in a controlled way so that we can identify the parts or functions within that activity and see their relationships. Only in this way can we design experiences which will enable a learner to acquire relevant skills and knowledges, then put them all back together again in a meaningful way. This enables learners to perform broader tasks, duties and jobs and to solve more complex problems.

Mager,[7][8] Butler[9] and Banathy[10] all propose similar analysis techniques. Banathy, however, takes a slightly different approach in that he proposes an alysis of learning tasks as opposed to an analysis of job tasks as proposed by Mager and Butler. This constitutes a difference in degree but not a difference in concept.

The writers mentioned so far do not as a rule use the term "Front-end" analysis. The term seems to have slightly different meanings for different people, but generally speaking it follows Silvern's JAHAA, i.e. establish what's "up front", what is needed. The term "needs analysis" closely fits the concept of a front-end analysis.

[7]Robert F. Mager, Goal Analysis (Belmont, California: Fearon Publishers, 1972), p. 10.

[8]Robert F. Mager and Kenneth Beach, Jr., Developing Vocational Instruction (Belmont, California: Fearon Publishers, 1967) pp. 10-24

[9]F. Coit Butler, Instructional Systems Development for Vocational and Technical Training (Englewood Cliffs, New Jersey: Educational Technology Publications, 1972) pp. 73-84

[10]Bela H. Banathy, Instructional Systems (Belmont, California: Fearon Publishers, 1968) pp. 41-53

Both Harless[11] and Mager[12] have dealt with needs analysis in terms of a "front-end". Although this kind of analysis is closely related to the JAHAA and task or job analysis as such, there is a difference which should be noted. The Harless, Mager type of analysis referred to here deals more with problem-solving techniques. It is designed to meet a slightly different purpose, i.e. solving training, attitudinal or environmental problems rather than examining human activities for the purpose of devising training. However, a systematic development of instruction could not be accomplished without first having done this type of analysis.

Before attempting to summarize some of these ideas it would be useful to consider two other approaches. One deals with the use of task inventories (more elaborate than Mager) and the other with analysis by specific criteria.

Wm. H. Melching, et al[13] in Procedures for Constructing and Using Task Inventories defines a task inventory as "a list of appropriate duty and task statements covering the tasks performed by workers in an occupational area. It may also contain indentification and background information and may be used to collect occupational information from incumbent workers." Three main phases

[11] J.H. Harless, An Ounce of Analysis Is Worth a Pound of Objectives (Falls Church, Virginia: Harless Educational Technologists Inc., 1970)

[12] Robert F. Mager and P. Pipe, Analysing Performance Problems or "You Really Oughta Wanna" (Belmont, California: Fearon Publishers, 1970)

[13] Wm. H. Melching and Sidney D. Borcher, Procedures for Constructing and Using Task Inventories (Centre for Vocational and Technical Education, Ohio State University, Research and Development Series # 91, March, 1973) p. 3.

are involved in the process:

1. construction of initial inventory of tasks (from standard sources, experts and job descriptions);
2. acquisition of information about each task (using questionnaires with large numbers of incumbents - "time" information is collected concurrently - additions and deletions permitted);
3. analysis of task data (results are tabulated - times and frequencies calculated).

Dr. Wm. J. Ullery et al[14] in Task Analysis by Selected Criteria: A Manual describes a technique which is much more sophisticated than Melchings. Both use an initial inventory of tasks and acquire information about these tasks. Ullery, however, builds his tasks into job levels around a job family hierarchy. This allows for branching and job restructuring. He also uses a set of 48 criteria to rate tasks and assist in developing the instruction. In general job levels are analysed in terms of:

1. specific tasks
2. functioning of incumbent with respect to data, people and things
3. minimum general educational development required as pre-requisite for satisfactory performance
4. aptitudes required for satisfactory performance
5. other significant worker traits, such as physical demands, temperaments and interests.

The General Aptitude Test Battery and Gagné's levels of learning were used as constructs to establish many of the 48 criteria. Ullery's

[14] Wm. J. Ullery and others, Task Analysis by Selected Criteria: A Manual (Northeast Centre, Technical Education Research Centres, Cambridge, Massachusetts, Interim Report III, March, 1972)

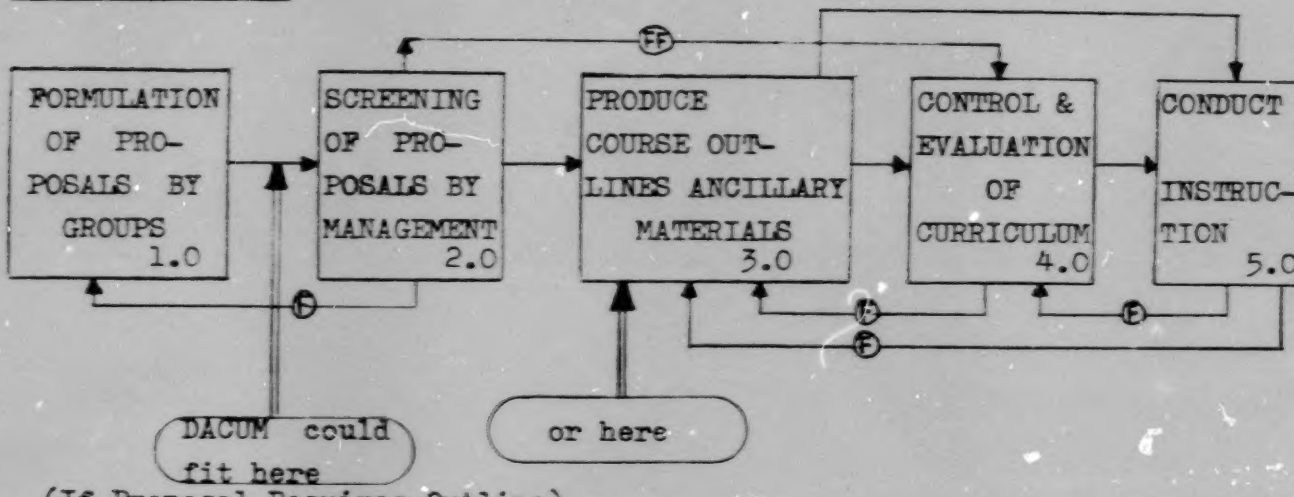
project ended up with three sets of performance oriented learning objectives for three job levels within the Biomedical Equipment Technician field. The end product is very much like a DACUM chart except it simply lists the related tasks with a similar number code while not indicating the major duty or larger terminal competence required.(15)

These last two procedures represent the inventory or questionnaire method of analysis, but both would produce a DACUM chart which in turn needs further analysis and development to implement training or education. The Ullery technique, in particular, is very appealing, but it does not meet the first requirement of a curriculum development front-end technique. It is time-consuming and requires heavy funding. Perhaps some rather complex occupational fields will require such a technique. We may not have any choice except to expend more resources. At least in Ullery we have a way of doing it.

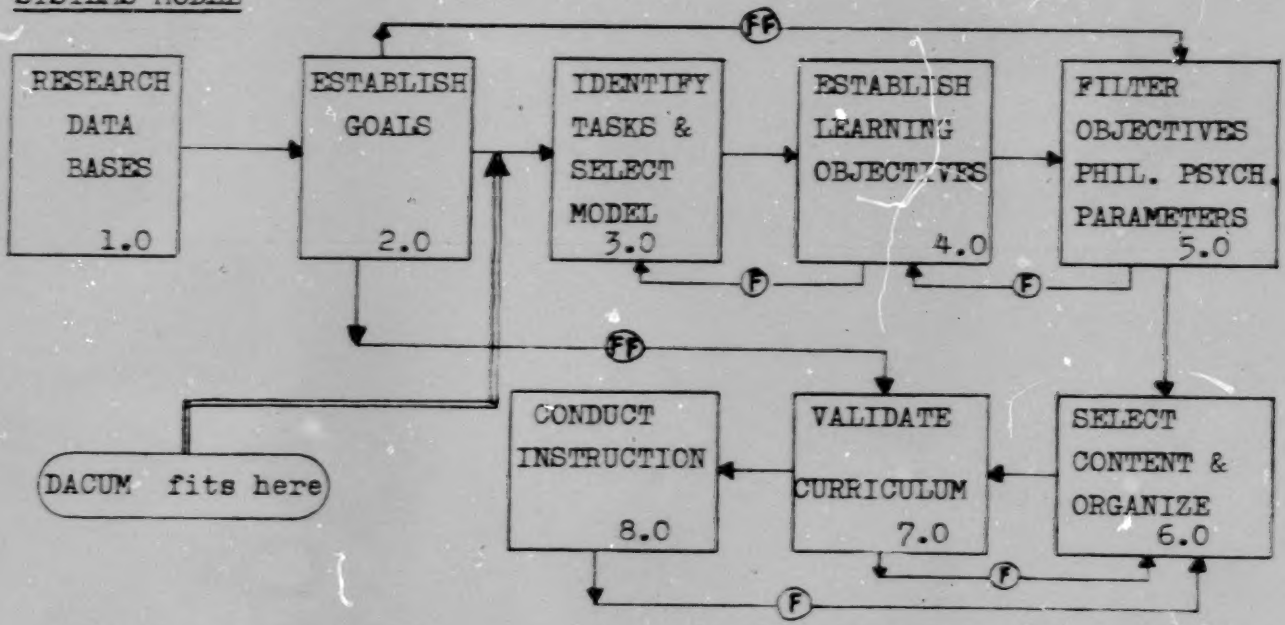
A few block diagrams may help to summarize what is being said here. An attempt is being made to demonstrate the practicality and applicability of the DACUM process (as it is used by the author) as a curriculum development tool. No attempt is being made to demonstrate the inferiority of other techniques, methods or practices.

15 See Appendix "B"

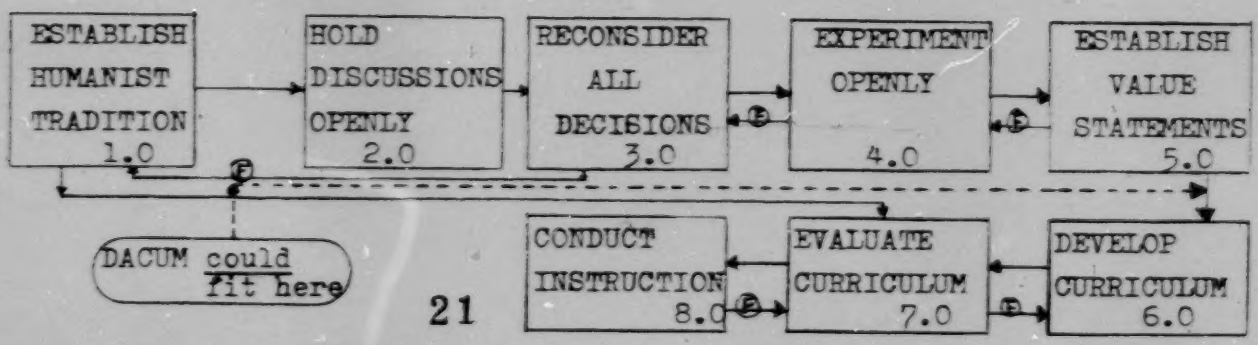
MANAGEMENT MODEL



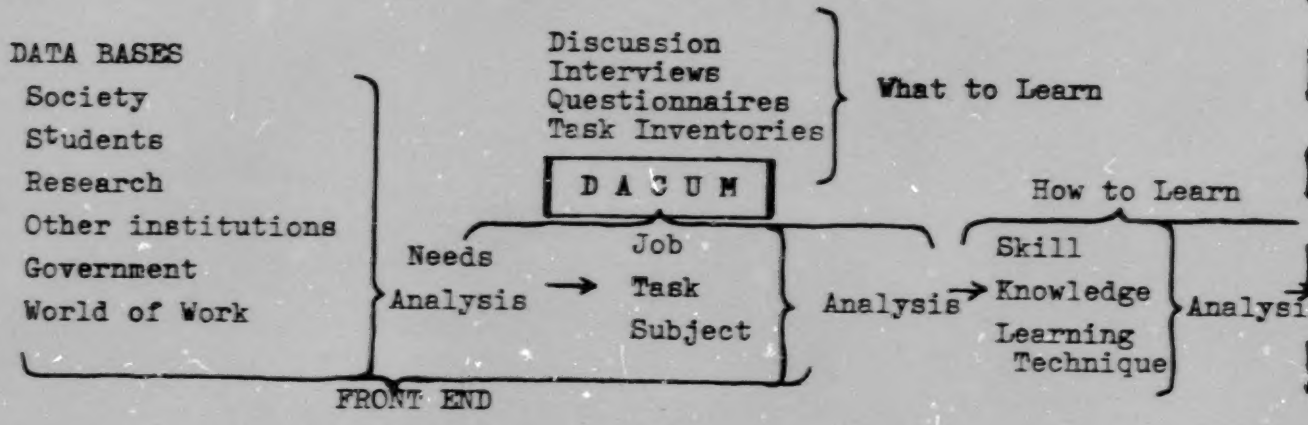
SYSTEMS MODEL



OPEN ACCESS MODEL



All systems models call for analysis of some kind.



It can be seen from some of the literature that front-end analysis is an integral part of systems models for curriculum development and it is suggested that DACUM is a legitimate front-end technique with its own particular advantages (and disadvantages, of course) which will be dealt with in Part V, Implications and Conclusions.

PART II

DACUM AS IT IS CURRENTLY BEING IMPLEMENTED

We have seen in Part I that systematic approaches to curriculum development require a defining and developing stage which necessitates various kinds of analysis. We have also stated that DACUM is both a process and a product and that it can be one more tool for helping to solve the "front-end" problems of systematic curriculum development. As mentioned earlier, not all users of DACUM implement it in the same way. Some users have a much broader application which includes the "HOW" of instruction as well as the entire instructional management system.

Information and documentation on the process is scarce - simply because it is a fairly recent innovation. Many of the statements and comments included in this section of the paper are from conversations, telephone calls, letters and discussions. The best and most complete written account of DACUM is in the Nova Scotia New Start Report by Robert E. Adams, 1972. A somewhat different account of DACUM is in a 16 mm. film by Howard Clement, Department of Regional Economic Expansion, Social and Human Analysis Branch, titled DACUM - Designing a Curriculum. This film was produced in British Columbia. A short write-up titled In Step with Holland College also gives a slightly different view of DACUM as a complete learning and evaluation model.

From the evidence at hand the early beginnings of DACUM were with the Job Corps project in the U.S.A. The concept was picked up and refined firstly in the Canadian West and then, through the Canadian

Department of Regional Economic Expansion, was spread into various Canadian New Start Corporations (not greatly different from the Job Core idea, at least in the beginning).

The story of exactly who and how varies from place to place and person to person. In spite of how it happened, the Nova Scotia New Start Corporation, the Saskatchewan New Start Corporation and the Vocational Educational Section of the British Columbia Department of Education began using it.

The New Start corporations no longer exist as such, but the innovative work that they did carries on in places like Holland College, Prince Edward Island; Nova Scotia; Newfoundland; Saskatchewan and British Columbia. Ontario is a new-comer with respect to DACUM.

For the Nova Scotia New Start application the development of the DACUM chart was one of the very important first steps, but the skills identified on the chart and the way in which they were organized became the management scheme for the entire instructional process. Appendix "C" illustrates this instructional process. Look also at Appendix "D". This outlines the instructional system now used by Holland College. The similarities are obvious. What we are seeing are models for INDIVIDUALIZED instruction. The big difference between these models and those found in the present literature (as in Part I of the paper) is the nature of the evaluation process. Students are to rate themselves. This is done at Holland College in their STEP[1] program. The point to note here is that the DACUM process (as defined at the beginning of this paper) was seen by the original developers as a part of a whole,

[1] STEP means Self Training and Evaluation Process

a whole instructional system which was specifically designed for adults in a vocational training situation.

What has happened is that the process and the product (the technical committee brainstorming thing and the charts of skill definitions) which is called DACUM as defined in this paper have been extracted from a larger process. Perhaps it would be fairer to say that it is done in almost the same way as the Nova Scotia New Start/Holland College group did/do it, but it is used differently. In the opinion of this author, the "extracting" has not changed the integrity of the process/product nor its usefulness as a front-end analysis and curriculum development technique. It is this extracting from a larger "whole" of an instructional-learning system that allows us to apply DACUM in many different settings. Whenever a task or behavioural analysis technique would be useful in outlining the skeleton of a curriculum, then DACUM could be used.

This brings us to the charts which have been produced and the point of this whole Section. Can the products of DACUM be used elsewhere? Does it matter whether the chart was produced by a group using DACUM as an independent process (so that a different instructional system can be developed) or by a group using DACUM as part of a larger process? From the best information available to this author it does not appear to make any difference, so long as the developer knows something of the origin of the chart.

When being developed as a part of a whole scheme there is rather heavy emphasis upon the level and the rating concept. Vertical alignment is also quite important for the grouping of skills.

These two factors get played down when the chart is produced for use in a different kind of institutional setting. The task analysis with a fairly broad range of skills become more important.

In other words, there may be some differences in job specificity and occupational differentiation between the two situations.

The Saskatchewan New Start group used DACUM in a different way again. The process consisted of a six step model, as follows:

1. Defining Terminal Behaviours
2. Selecting Evaluation Techniques
3. Defining Instructional Unit Objectives
4. Designing Instructional Unit Evaluation
5. Preparing Learning Activities
6. Preparing Individual Student Activities

A DACUM chart produced in this way (not a two or three day technical committee doing brainstorming) is more like a scope and sequence chart.[2] It must be mentioned that the Saskatchewan group was primarily interested in Basic Adult Education - literacy and numeracy, while the Nova Scotia group worked with job specific training - motor vehicle mechanic, deckhand, nursing assistant, etc.

The Saskatchewan New Start charts <u>appeared</u> much more content oriented (although they were embedded in a behavioural, generic skill base) and many subsequent charts modelled on the LINC[3] charts have been produced in Ontario and elsewhere which are

[2] These are used in primary and secondary school curriculum development mainly as subject-specific course guides or lesson/teaching-point outlines.

[3] LINC - <u>Learning Individualized for Canadians</u> - is an Adult Basic Education packaged program in language arts and math produced by Saskatchewan New Start Corp. This has been a <u>very</u> successful venture and no detraction from their work or charts is intended.

actually subject taxonomies or a content, scope and sequence. When in the hands of a person who is not aware of its origin, use, application or adaptation, content types of charts defeat the whole purpose of behavioural(task) analysis as a learning technique leading to performance objectives.

The British Columbia technique is very well explained in the film DACUM - Designing a Curriculum. A dynamic group process is used to develop the charts, but they are organized differently than the Nova Scotia, Prince Edward Island and Ontario charts. These charts are set up in tracks (horizontal, parallel bands) with sub-groupings that become blocks, or units, of a course. The steps taken in their entire DACUM process (not just producing a chart with a committee) are listed below:

1. Establish National/Provincial advisory committee;
2. Establish curriculum sub-committee;
3. (a) Develop, publish and validate curriculum chart;
   (b) Identify learning resources;
4. (a) Develop, publish and validate syllabus modules;
   (b) Relate and code resources to syllabus;
5. Introduce chart and syllabus to instructors;
6. Monitor effectiveness and suitability of curriculum content.

These B.C. charts are produced for Province-wide distribution and act as the chief curriculum document in many cases. Other charts are produced in conjunction with educational personnel from foreign countries. See Appendix "A" for an example of a B.C. chart. As far as can be determined, there is no concept of self-rating or a rating scale being used as an integral part of the instructional system in any of the Western applications of DACUM.

That leaves the Ontario charts. As mentioned before, several of these are of the scope and sequence type. In addition, some of the charts, at Humber College for example, were developed by instructors within an on-going program rather than by a community or Provincial committee. Charts developed by instructors in an on-going program tend to be set up according to the vertical subject type of curriculum organization or the theory-practice approach.[4] These charts are useful, but do not provide the "embedded" or "real-job" type of curriculum which the original DACUM was intended to do. The chart which is an after-thought cannot become an instrument for relevant, job or generic skill-oriented change in the learning environment. Those charts developed by specially selected business and industry committees have, according to all information collected by the author so far, been the most useful and relevant ones implemented to date.

To summarize, DACUM appears to have the following meanings, uses and applications:

1. DACUM:	dynamic group behavioural/task analysis	+	sheet(s) of paper show skill profile for course or job
USED BY:	the author; some Ontario colleges		
FOR:	basic curriculum & instructional development; instruction can be delivered in a variety of ways, e.g. - group, individual, correspondence		

[4] Such an approach may very well have been the advice of a local advisory committee several years ago.

2. DACUM: includes number 1 as part of an overall instructional system;
chief characteristics are self-rating and individual

USED BY: Nova Scotia New Start Corp. (now defunct, but several people are involved with the Adult Vocational Branch of the Nova Scotia Department of Education);
Holland College, Charlottetown, P.E.I.

FOR: further curriculum development or as part of a complete training system - managing instruction - record keeping and tracking or monitoring of students - budgeting and allocating resources, communicating skills to potential employers

3. DACUM: a series of procedures which gradually develop the objectives, evaluation and learning activities/resource elements of a complete system (may include a variation of number 1 above)

USED BY: Saskatchewan New Start Corp. (now the Training Research and Development Station of the Department of Manpower and Immigration)
Vocational education branch of British Columbia Department of Education

FOR: development of primary (curriculum skeleton) and secondary (detailed course outlines) instructional elements as well as content networks to be fitted into an instructional delivery system

4. DACUM: a chart showing the content or scope and sequence of the substantive elements of a course or program

USED BY: some Ontario colleges and others

FOR: course development, communication to students and teachers, student records

No matter how DACUM is defined and is being implemented, the two features which are clearly common to all areas are:

(1) the use of a systematic approach to curriculum development with its attendant requisite to analyse; and

(2) a chart of graphic representation of the curriculum or course requirements is produced and used for various purposes - from a simple, content outline to a complete record keeping, management system and communication tool. 27

It should be pointed out that the charts themselves are only PRIMARY instruments. They are not detailed sets of course or program objectives. The definitions on a chart are limited to about eight words and most have even fewer than that. These definitions must be OPERATIONALIZED and the SECONDARY instruments of instruction must be produced. By secondary instruments is meant the learning objectives, the enabling techniques and experiences necessary to master the skill, job, task, ability, competency or concept expressed in the chart definition. In other words, the whole teacher's job must now be done.

One more note on the current uses being made of the charts. A carefully selected committee (see PART III - DACUM Procedures) with one or more existing charts and a comprehensive explanatory session can, in rather short order, add to, update, delete from, revise and generally "localize" the chart (s) giving a new and relevant program outline to the developer. The committee can also be asked to contribute specific content items, i.e., which type of - motor, switch, instrument, paragraph structure, legal code, set of principles, attitudes, physical attributes, arithmetic problems, business machines, etc.,etc., are being presently used. These committees are a tremendous data base from a content standpoint AFTER the skill profile or behaviourally oriented (PRIMARY elements first) chart is COMPLETE.

Supplement to PART II - INDECORE in Post Secondary Programs

Since the Second Edition was published the author has attended a presentation by Mr. Leo Mitchell of the Ontario Ministry of Colleges and Universities, Institutional Training Branch. At the Senior Adult Training Officers (SATO) semi annual meeting, November 26th, 1975, Hamilton, Ontario Leo provided some new insights on the use of DACUM by the Ministry.

He has been working with post secondary programs in the hospitality, housing, recreation and food areas. He calls his approach INDECORE - (Industry Development

Core). The skills in each program area are identified in the usual group analysis technique but some special difficulties have been encountered by Leo within the management aspects of programs.

His approach has been to hold a sort of second DACUM with another group of experts in the management (or other difficult areas) then to use these skills to build courses for the original program.

He has also been developing the concept of career paths using the approach of: job entry skills→ on- the- job skills→ management skills - This ties in nicely with the concept of Recurrent Education.

The methodology follows four basic stages -

1. Define the job
2. Select INDECORE participants:
   - 10 - 15 people
   - must be active on the job
   - free of bias
   - good communication
   - recognized as top people in their area
3. Identify areas that the trainee must be competent with (General areas of Competence or Terminal Objectives)
4. Carry out the group process to identify skills (development of bands) each band becomes a course

The INDECORE leader or facilitator must have the following competencies:

- be able to control a group
- be futuristic in his views
- does not need competence in skills of job
- must have competence in management skills

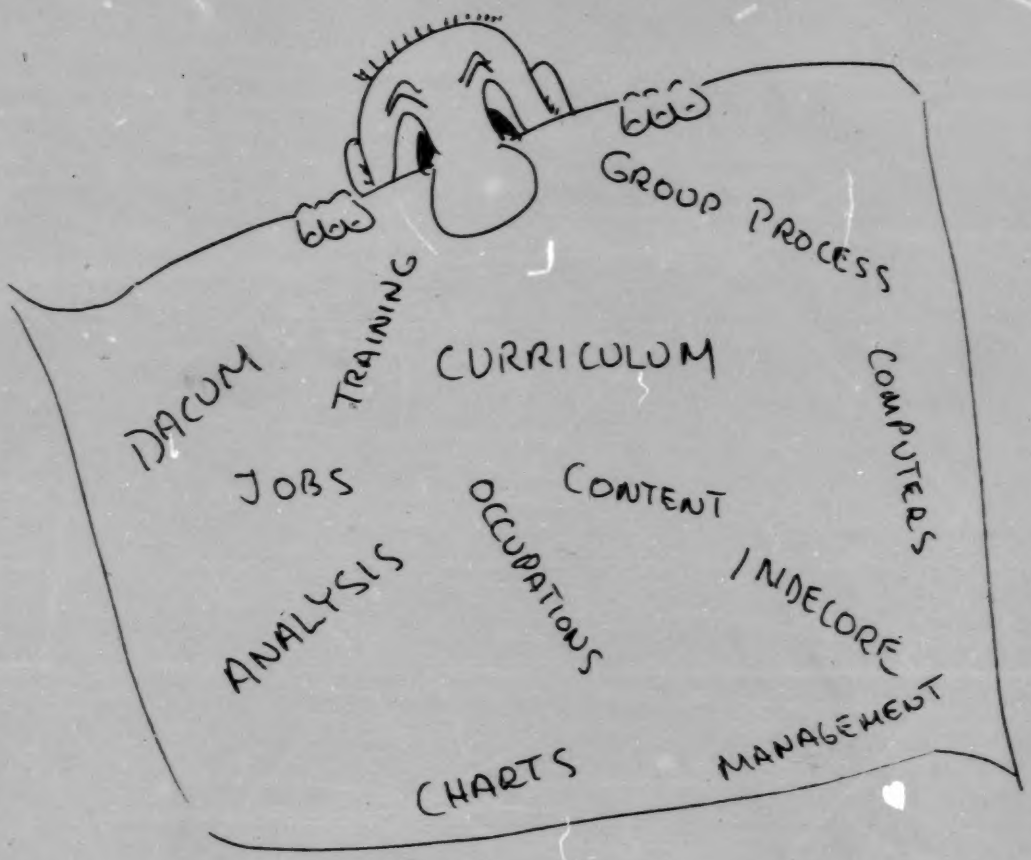
Leo stresses the old idea of an Apprenticeship LOG to be updated by the employer. The INDECORE chart would become the framework for career path - recurrent training and upgrading.

There is, apparently, a fair amount of support from the senior most levels (Council of Regents) of the College system in Ontario for the whole process.

The question of standards and details of content would be left up to the individual college.

How is this process set up and controlled so that useful charts are produced?

See PART III.



PART III

DACUM PROCEDURES MANUAL

OVERVIEW

We are talking about DACUM as a process here, the process required to produce the DACUM CHART. A co-ordinator works with a specially selected group of individuals who have a range of experience in a particular field of endeavour.

By guiding dynamic group discussion and drawing out the members of the DACUM committee, the co-ordinator builds up a kind of skill profile or job analysis. He prints short definitions on file cards which are stuck up on a large blank wall in a structured pattern. The definitions are short, begin with a verb or imperative and hopefully cover the entire range of activity within the field of endeavour (job, occupation, vocation, subject area). The analysis proceeds from a fairly high level or broad range of activities to increased levels of specificity. The degree of specificity is carefully controlled by the co-ordinator.

The cards are arranged or sequenced according to an appropriate rationale, i.e. level of difficulty, subject toxonomy or logic or the nature of the job or occupation. By numbering the completed arrangement of cards the information is transferred and transcribed on to sheets printed with blank squares. These sheets are now used as the basic curriculum development instruments and are referred to as DACUM CHARTS or Student Program Charts.

ASSUMPTION-TO USE DACUM

This manual assumes that a decision has been made to develop a curriculum or to put forward a proposal for developing some particular program or course of instruction. In some cases this initial decision may involve a number of procedures, meetings and reports from various regulatory bodies.

SOURCES OF INFORMATION

The steps outlined here are guidelines only. They are not intended to be prescriptive. They are based upon the author's experience and information gathered informally from others who have done it. The author's indebtedness to Robert Adams' report DACUM: Approach to Curriculum Learning and Evaluation in Occupational Training, March, 1972 is fully acknowledged. The contributions of George Luddeke of Northern College and Glen Tippett of the Training Research and Development Station, Prince Albert, Saskatchewan, are also gratefully recognized. *

TARGET AUDIENCE FOR THIS MANUAL

The target audience for this part of the paper includes those curriculum specialists with the responsibility for outlining the goals and objectives of a program or course. Personnel with titles such as Curriculum Co-ordinator, Program Development Co-ordinator, Educational Development Officer, Educational Services or in some cases Professional Development or Staff Development Officer or Co-ordinator might be interested in using this material. Training and Development personnel in business, industry and government may also be interested.

* - Now with Dep't. of Manpower & Immigration, Ottawa (January, 1976)

ASSUMPTION- CHART CAN BE OPERATIONALIZED

Another assumption is that the person who co-ordinates or conducts the DACUM and produces the chart can either, by leading an appropriate group or by calling upon the appropriate human resources, carry out the subsequent steps to operationalize the chart. Anyone with an instructional systems or educational technology background or even job/task analysis leading to appropriate on-the-job and institutional training should be able to do this. A trained instructor with nothing more than the chart and some expertise within the content and skill area of the chart should be able to conduct a successful, conventional (group oriented) program. The structure and nature of the charts, however, when produced by the techniques as outlined here are more conductive to individualized learning delivery systems using learning packages or Individual Learning Programs (ILPs) as they are called.

This guideline does not attempt to deal with the techniques of how to operationalize these charts. Authors such as Mager, Butler, Burns, Kapfer, O'Reilly and Langdon have developed techniques on the HOW aspect of instructional development. An individual learning program titled Instructors of Individualized Programs by the author was designed to enable instructors to perform the tasks necessary for operationalizing DACUM charts.*

THE CO-ORDINATOR AS KEY PERSON

The co-ordinator is the key person and nothing could be truer here than the old saw "You learn by doing". To do a DACUM the

* SEE ADAMS' SUGGESTION IN EPILOGUE

coordinator should have a pretty broad academic and interpersonal background. He/she needs experience in group handling (stand-up teachers and lecturers of adults develop these skills). The coordinator must have a facility with words, a good DESCRIPTIVE and BEHAVIOURAL vocabulary is necessary; experience with curriculum and analysis techniques is also important. A knowledge of the subject area being DACUMIZED is NOT necessary and may even constitute a hindrance.

Studying Robert Adam's report on DACUM and a variety of DACUM charts is a useful exercise. The author has a fifty minute video tape which was edited out of a two day DACUM session. Simulations are not as good as the actual exercise, but it may be possible to do some "dry runs" with willing volunteers. Mr. James Sussi of Kodak does something like a DACUM in about twenty minutes using file cards and a storyboard. A random group is asked to identify the occupation of "Housewife". Everyone can participate and perhaps a few simulations of this kind would be useful before the real thing. Areas such as "Housewife" are useful because the group must be manipulated into stating what has to be <u>done</u> rather than what has to be <u>known</u>.

Mr. Frank Winter of Sheridan College, Oakville, Ontario uses this technique very effectively for group problem solving sessions. IBM has also expressed interest as well as Bell Telephone using the technique for developing computer programs and for training.

Ability to quickly print legible definitions on 4" x 6" file cards is essential.

<u>SELECTING AND ORIENTING THE DACUM COMMITTEE</u>

Assuming that an appropriate person is prepared to coordinate a DACUM session, the next task is to select the proper committee members. This task is sometimes the most difficult activity of all.

It is often considered expedient to ask people to sit on a DACUM committee for political reasons. In the author's view, this temptation must be resisted. If you have no choice, be sure that the co-ordinator is aware of the "political" appointees. These people often have vested interests or a private axe to grind. For DACUM work they are a hinderance and it requires all the skill the co-ordinator can muster to control them and the work as it proceeds.

Whoever is responsible for getting the DACUM committee together should be fully aware of what DACUM is all about. A short eighteen slide presentation has been prepared by the author for this purpose. A brief handout with a few pictures and sample charts is also useful. The best people for the committee are those who are actually doing or supervising the job or are directly involved with the endeavour.

The following guidelines may be useful:

1. Committee members should be from a cross-section of the business, industry or enterprise. Large, medium and small firms should be represented.
2. The committee should be representative of the entire region (local, regional, provincial, etc.) being considered.
3. Quite often the skills that are involved cover a number of areas within the industry - servicing, manufacturing, distributing, developing, selling, etc. There should be representatives from these different areas.
4. The committee should not be less than 6 nor more than 14. 10 seems to be about ideal in this author's experience.

5. Committee members should be prepared to attend for the FULL two days, all day. Some form of remuneration should be offered (daily rate or a fancy dinner, for example).
6. Committee members should be selected on the basis of their ability to verbalize, keep abreast of their own field and to make predictions and projections about future developments within the field.
7. If an executive or administrator of a profession, trade, union, industry or business organization offers to get people, attempt to get others involved as a means of striking a balanced committee. These people usually pick other members with exactly the same partisan or personal interests in mind. This leads to a chart designed to help a segment of the industry rather than to serve a more general need.

   It may not be possible to avoid this situation and still maintain the support of a rather influential group. One thing that has been tried is to hold several DACUM committees, each with its own particular interests in mind, then analyse and synthesize the different charts into one chart. This technique is only recommended as a final alternative. It is time-consuming and everyone feels compromised afterward.
8. A short explanation of DACUM with perhaps a picture or two and a list of its advantages should be on hand to send out to potential DACUM committee members. These people often have to justify in depth to their superiors the reasons for being off work for two days. Personal contact is much better than letter or even telephone.

9. In small communities the difficulties of getting a committee together seem somewhat less. In larger communities trade unions and industry/business organizations are often reluctant to get involved. They see the school or college as trespassing on their territory.

   The kinds of people to avoid in DACUM work are the leaders of such outspoken groups or organizations as mentioned before. Public relations and managerial personnel who have never actually done the job AS IT IS BEING DONE NOW should also be avoided.

   Oddly enough, instructors, too, should not be members of a DACUM committee. An instructor with any experience at all carries a number of biases about how a course should be learned (theory first, and large doses of it too, until the student knows what he is doing as well as I know, etc., etc.).

   If the actual or proposed instructor of the new or considered program or course is available, it is an excellent idea for this person to sit in as an OBSERVER, but not as a participant.

10. Once the committee has been selected, a pre-DACUM session is recommended. A general talk with perhaps a slide show, sample charts, video tape or film will save a lot of valuable time during the two day session. If this is not possible, the short explanatory notes or monograph mentioned before

should be sent to every member with the time, place and telephone number (many of these people are the key personnel in their area and often get urgent calls).

DACUM is a new and different experience for most committee members.* Every bit of orientation and preparation that can be done prior to the session adds to the quality of the chart.

PHYSICAL REQUIREMENTS AND ACCOUTRAMENTS

1. A room with at least 30 feet of plain unbroken wall. This is to be used for putting up and arranging the cards. (Some co-ordinators use huge storyboards with plastic strips for holding cards.)
2. Comfortable chairs, preferably swivel-type with arms.
3. Enough low tables or desks to completely line up along the length of the wall. This line of tables serves to separate the seated members of the committee from the wall. It's also a place for charts, coffee, ashtrays and microphones (if you are recording).
4. Coffee should be available throughout the two days. If the committee as a whole breaks for coffee, leaving the room, the process is difficult to get started again. It is suggested that the committee not go out for lunch. Bring in sandwiches or eat in a nearby cafeteria. The longer they linger, the more difficult it is to get back to the task.

* Bob Adam's DACUM Coordinators Kit has an excellent tape for orienting the committee.

NOTE - All of the foregoing furniture arrangements are intended to keep the committee focused on the wall. Once they begin discussions among themselves the process lags or deteriorates. The row of tables is needed because the level of enthusiasm or excitement can incite a member to go up to the wall and pull off or rearrange cards. All cards must be controlled by the co-ordinator and only moved or changed with group consensus. (See Appendix "E")

5. A blackboard or large sheets of paper for outlining the occupational or subject area.
6. Half a dozen felt pens (black).
7. Large printed sign stating "The Individual Must Be Able To..." This is fixed on the wall, fairly high and to the right of centre.
8. Supply of file cards - 2 different colours - one colour preferably of a larger size. For example, 5"x7" blue and 4"x6" pink or white.
9. Plastic putty for sticking the cards to the wall.
10. Three metre or yard-sticks. The putty is placed along these in small pieces handy for placing up cards in a hurry.
11. Sample DACUM charts - preferably from a related area of endeavour.
12. Sample verb lists taken from other charts and curriculum or instructional objectives lists. These can be handed out if it is obvious that the committee is having trouble verbalizing the skills.
13. The author has not used name tags. This does not seem necessary, but a prepared information card which the members fill out provides you with an accurate list of who is there (employers

sometimes send substitutes. You have no control over this unless you set up an embarrassing situation which puts everyone off right from the start.) and some idea of their general experience.

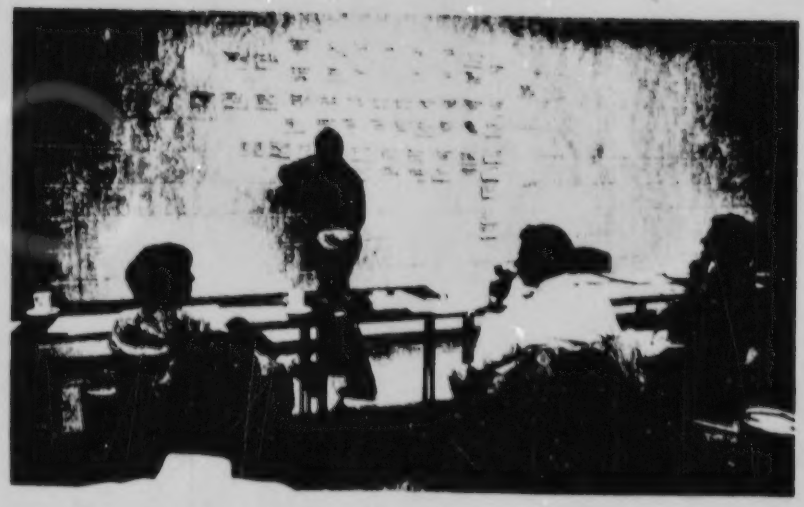
14. It is a good idea to hold the session away from the school or college altogether, if possible. Committee members may insist on a guided tour of the facilities, school administrators may want to drop in or bring in guests for political reasons. All of these detract from the session.

    If the session is to be held on school premises, the co-ordinator should insist in the strongest possible terms that they be undisturbed for the whole two days.

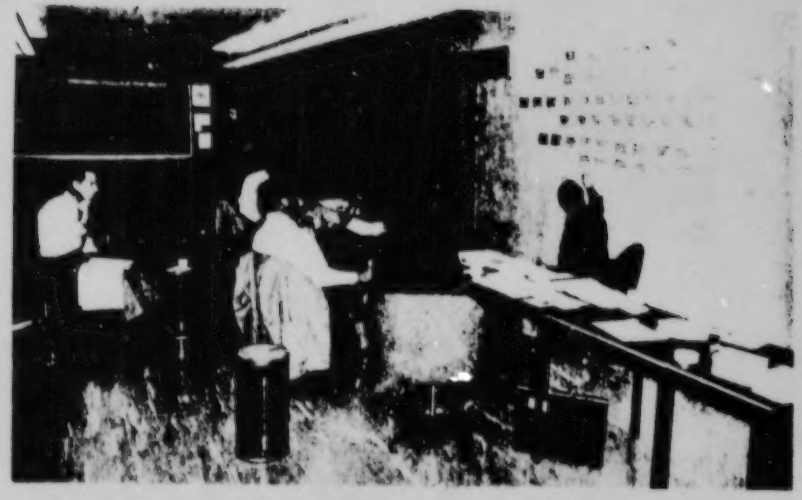
SEQUENCE OF TASKS

The session itself goes through several stages:

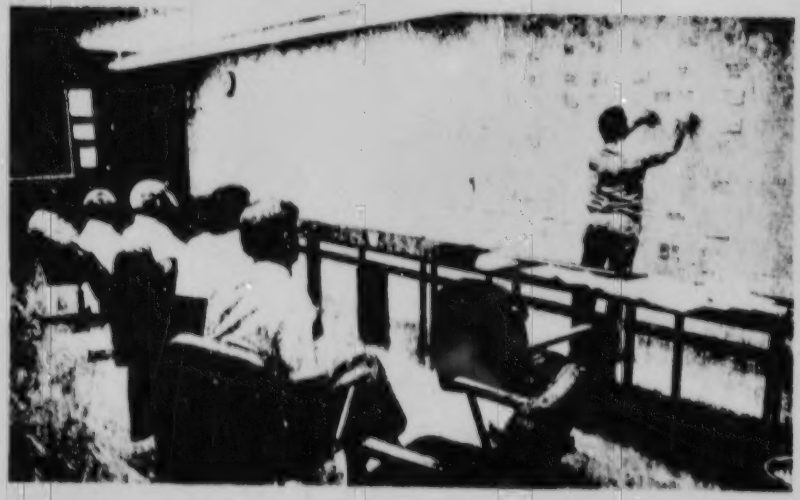
1. General introduction and orientation.
2. Review of the occupation or subject.
3. Identifying the General Areas of Competence.
4. Identifying the specific skills for the first general area - this is called completing the first BAND.
5. Identifying specific skills and completing the remaining bands (one band for each General Area of Competence).
6. Reviewing and refining the definitions.
7. Sequencing the skills.
8. Establishing levels of competence for each skill in terms of difficulty, frequency and general importance to the overall endeavour.
9. Final structuring of the chart and conclusions.



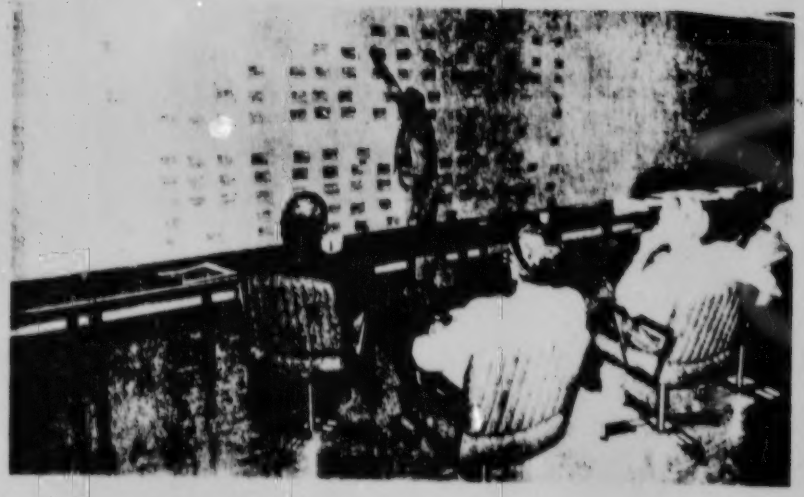
Starting the process, note major areas of Competency down the right side.



Working out each band of individual skills for each major competency.



Sequencing each band according to the order in which the skills are mastered.



Lining up the skills in groups which provide job levels within the program.

STAGE ONE - GENERAL INTRODUCTION AND ORIENTATION

Stage 1 could be very short if the co-ordinator has had a chance to meet with the committee before. If the committee has had no prior briefing, then an overview of the whole process must be given. The co-ordinator must stress that they will be identifying behaviours or activities rather than knowledges or concepts (hence the large sign on the wall).

A rationale for the process can be supplied with a short story about the hypothetical development of a program, say heavy equipment or maintenance of some kind. Adams does this nicely in DACUM 1972. In the course of the orientation it is a good idea to give a short resume of your own background and qualifications as a co-ordinator (establish your credibility).

An outline of a short conceptual orientation story follows. Have members refrain from asking questions until the story is finished.

- Need for a program is established - brand new
- Institution does not have any experience - resources, equipment, etc.
- Hires a teacher who has had supervisory experience and has trained new employees
- New teacher sets up course exactly as he did it on the job - spends time with individuals - lots of hands-on experience - can tell when trainees are competent - helps them get jobs - the learners do well in the jobs
- During next few times through teacher looks for more efficient way - sets up presentations and lectures - feels they should know more - adds more content - related study, math, physics, etc.

- Graduates want recognition for their studies - a certifying body sets up qualifying exams - more time is spent in preparing for the theory exams, less time is allowed for hands-on practice - teacher changes from a foreman to a specialist presenting theory
- More and more trainees do not finish - others are counselled not to take course because of so much theory - Industry experiences high turnover with the graduates - they move on to something else very quickly
- Eventually a study team examines the situation and recommends that there should be a higher pre-requisite - grades 10 or 11, or better, and Industry should restructure its jobs to provide upward mobility
- BUT Industry needs these men - so they start their own training programs or complain bitterly to the schools that they are not producing the kinds of people needed.

WHAT WENT WRONG? -

- Instructor did not specify just what he wanted students to be able to do - needed a set of learning objectives or goals based on Industry's requirements
- Instructor could not evaluate learner performance - needed a way of evaluating what is related to the job - students must reach a certain minimum level of ability or competence in order to start in on the job
- Needed a set of procedures which would prevent instructor and students from drifting into modifications leading away from the learning objectives

If committee sees that this applies, introduce the DACUM solution:

- Use an existing chart to explain how the profile is set up
- The required learning objectives come from the definitions on the chart
- Rating system with a base line - uses levels - say LIMITED, MODERATE, SKILLED
- Rating system expands each definition - "The Individual Must Be Able To ..." This relates to every skill - remember that this course will prepare a person to START, not give him the equivalent of years of experience
- What will be done with the chart? A set of learning objectives and experiences will be pulled out of it and a course organized around it. ONLY THE COMMITTEE CAN CHART OUT THIS IMPORTANT BASIC SKELETON OF THE CURRICULUM.

STAGE TWO - REVIEW OF THE OCCUPATION OR SUBJECT

It is important that the committee "ZERO IN" on the representative person they are about to analyse. They need a mental image of a real or proposed set of competencies possessed by some individual involved in the occupation or dealing with a subject area.

One way in which this can be done is suggested by Adams and has worked successfully for the author:

Divide the world of work (if the DACUM is dealing with an occupation) into four main categories:

Professional Technician Craftsman Operator

You may have to choose other terms, such as "Tradesman" or "Assistant" depending on the group.

(Remember that DACUM can be used for so-called "subject" or "discipline" analyses as well. The procedures, of course, would differ, depending on the subject and the nature of the committee, i.e. experts, teachers, supervisors, professors, recognized members of the community, etc. The co-ordinator must be able to innovate.)

Get the committee to give the names of jobs within this field. Fit them together in a kind of network on the blackboard so that the field becomes clear. The mobility within the field should be evident and the single or group of occupations which they are going to analyse must be made as specific as possible.

STAGE THREE - IDENTIFY THE GENERAL AREAS OF COMPETENCE

Move into this quickly. Use the larger of the two types of cards you have on hand.

Ask for duties or broad areas of ability which occupy a large part of the time on the job.

Most committees tend to give detail at too low a level.

Ask if this duty has a number of sub-duties or tasks. If they can't break it down, do not accept it as a General Area of Competency.

Get printing on the cards. Insist on a verb or imperative and no more than 6 words.

Put cards up as quickly as possible in a vertical row on the right side of the wall.

You will probably have to regroup and change quite a few of these as the session proceeds.

Once these General Areas of Competence are up (there shouldn't be more than 10 or 12) group them under general areas. For example, supervisory, administrative, use of tools, analytical, problem solving, etc.

STAGE FOUR - IDENTIFYING THE FIRST BAND OF SKILLS

Choose an area of competence that appears to be fairly easy for the committee; hand skills or manipulative skills rather than something analytical or of a supervisory nature.

Insist upon "The Individual must be able to ...". Do not accept definitions which start with "He should know..."; "He has got to understand...", etc. When the members persist in saying this, ask "Why does he have to know that?". Once they get the idea, the definitions will come in spurts. Be ready to print many cards as quickly as possible and get them on the wall.

You must let them discuss among themselves as long as they stay on topic. Keep bringing their attention back to the wall. Keep repeating the definitions they have already come up with.

You should reach the end of the first band by about noon of the first day. Do not leave an incomplete band and break for lunch. It is fairly easy to tell when a committee has run dry. The problem for the co-ordinator is really in not cutting it off too soon.

STAGE FIVE - COMPLETE THE REMAINING BANDS

Be sure to tell the committee that order or sequence does not matter within the specific band they are dealing with at this time. Insist that they stay with one band at a time. Do not accept definitions for other parts of the chart.

This is a trying and exhaustive process at this stage. You must show patience, firmness and consistency.

Do not allow one member to take over. Draw out the less vocal members.

Definitions can be refined as you go along, but insist on consensus rather than one person making the change. Do not allow anyone to touch the cards.

You will probably rearrange the original set of general competencies as the final bands develop. This is a natural part of the process experienced by the author.

It is amazing, to this author at least, how often the attitudes toward the job come out as specific skills. These are mostly ignored in training programs. It may not be easy to operationalize these attitudes as part of the course, but by being included in the chart they do give guidelines to developers. As such, the committee should be encouraged to specify these areas, e.g. getting along, presenting good company image, responsible reporting, punctuality, fairness, codes of ethics, etc.

There is usually some confusion over analytical communication and supervisory skills if they apply to a session. Jobs which are well established tend to be easier to analyse. Technician and technologist occupations are more difficult to deal with. Here is where the co-ordinator's skill with vocabulary, analysis and experience with a wide range of curriculum becomes essential.

The communications requirements of a job usually do not look like any "English" course anyone has ever taken. This is the reason seasoned instructors are not asked to sit on DACUM committees. The co-ordinator must also maintain a neutral position and accept what the committee says, even if those definitions do not match any of the co-ordinator's previous experience.

When does the co-ordinator cut off the definitions? When the work becomes laboured or repetitive, or members begin redefining cards which they have already agreed upon.

STAGE SIX - REVIEWING AND REFINING

This usually occurs before mid-day on the second day. By now the committee is "tuned in" on the task. They have expanded their common lexicon and scope in the use of verbs and imperatives.

The co-ordinator now goes over every card, asking, probing - "exactly what do you mean?", "would another person understand what is meant by this definition?".

Several rewrites usually occur and occasionally a card is dropped or added.

STAGE SEVEN - SEQUENCING THE SKILLS

This usually goes quickly. Many decisions are arbitrary, it making no difference which task or skill is mastered first.

Almost without exception the cards are reversed. That is, the committee stated the simple, primary tasks first which are closest to the General Competencies on the right and the more difficult ones later. The simplest tasks are lined up on the left. They usually get more complex as you read the chart toward the right.

As the work proceeds it becomes evident that if the first portion of the chart on the left side were mastered a person should be employable at a rather low level (say helper or assistant) in the occupation. As one proceeds with the tasks toward the right a higher and higher level of competency in being able to initially deal with the occupation is gained.

Some vertical alignment may be helpful where descriptions are related from different bands, for example "safety" may appear in several bands. If these are aligned vertically they constitute a logical group of learning objectives or a "UNIT" of the course.

The sequencing often follows the logic of the job itself. When sequencing a subject oriented course or program the rationale for the sequence may be quite different. It might depend upon what is imagined as the most interesting sequence; what theory/practice combination seems best based upon experience; or it may follow the classical lines of the discipline, i.e. arithmetic before algebra, analytic geometry before calculus, sentences before paragraphs, logic before ethics, atoms before molecules, etc.

It is interesting to note that another way of sequencing based upon the taxonomy of learning objectives is being used, for example the taxonomies of Bloom and Gagné. Here the cognitive processes are sequenced rather than the skills or content.

STAGE EIGHT - ESTABLISHING LEVELS OF COMPETENCE

How well must each of these skills or abilities be mastered? What degree of importance for job or subject area success is attached to each definition?

This has been handled in a couple of ways. If the committee is highly local and has the time, then these questions can be dealt with pretty specifically. Actual areas of content can be established and standards of acceptance set. This discussion usually takes place at subsequent meetings.

In most cases, however, the committee is a very temporary group and its members are anxious to get back to their primary responsibilities. A simple technique of establishing a LIMITED, MODERATE or SKILLED level of competence works quite well. It is general enough for the committee to agree upon and specific enough for the course developers and instructors to operationalize. A simple L, M or S is elicited from the group for each card.

Most charts developed so far have no indication of this level of ability or competence. It has been left to the devebpers and instructors to set these levels. This works as long as there is feedback or responses from the employers of the graduates or the people who receive the graduates for further education or training.

The most logical place to obtain these standards are from the committee and future employers. They, however, seem to have difficulty being realistic about their expectations. They want experience, but the schools are equipped to offer training.

Perhaps the best criteria for levels or standards of performance are frequency of task performance and how critical the task is to the success of the whole endeavour. For example, you might hear "I don't care if he can't solder too well, but if he can't read the colour codes of the components, then forget it.".

It may be possible within the framework of managing, organizing and operating a program, while using the chart as the basis, to build in more of the critical experience called for. Day-release, co-op and evening or weekend courses may allow for this.

There is a problem here that must be solved. Each institution, committee and co-ordinator will have to find the best solution for

its individual situation. Perhaps further meetings of the committee can resolve this if you can get them together again.

STAGE NINE - FINAL STRUCTURING AND CONCLUSIONS

When it appears that the whole chart is complete, sequenced and some indication of performance levels worked out, then review each and every card in a narrative fashion which builds a mental picture of the entire endeavour that has been analysed.

Do not allow any wholesale changes, but minor additions, deletions, expansions, etc. should be entertained.

Demonstrate to the committee how the chart now resembles a series of training chunks or courses that allow a person to move through the various levels of the occupation.

Explain once more what will be done with the chart. They must go away convinced that their job has been worthwhile and that the chart will be operationalized and used.

Now is the time to answer their general questions about training, pre-requisites, standards, future plans of the institution, general educational philosophy and anything else that comes up.

Be sure to send letters of thanks with copies of the chart to each member and, where appropriate, to their employers.

PRODUCING AND REPRODUCING THE CHARTS

One last technical note. When the committee leaves, number each card so that they can be transcribed on to DACUM charts.

We use a two-digit code for the General Areas of Competence, i.e. 01 to say 10 or 12.

The sub-skills in each band carry the code of General Area of Competence plus another two digits, i.e. 0101,0102, 0103, 0104, etc. A further two digits could be applied to the next level of analysis.

If the whole chart is given a code , say from the Canadian Classification and Dictionary of Occupations (CCDO) then each definition will have a unique number or code. *

We use an IBM Selectric - 12 pitch, elite typewriter. The blanks are on 11" x 17" paper. (See Appendix A). Masters are made by either photo-reducing or by having metal plates made (for offset). A regular IBM or Xerox copier will make copies of the 11" x 17" in two pieces or a reduced copy.**

When a chart is felt to be reasonably permanent then a metal plate is made and 11" x 17" card stock copies are run on offset and given to the students and instructors. If more than a single sheet of 11" x 17" is needed, then the whole chart is spiral bound and makes a rather nice package.

There are many ways of setting up and reproducing the charts. Perhaps microfiche or film will be next.

This leads us to the charts themselves and PART IV of this paper.

* See EPILOGUE - PART a coding suggestions from College Bibliocentre

** As of January, 1976 we have had all the charts reduced to a standard format, (8 1/2" x 11"). We found the 11" x 17" sheets were becoming difficult to handle, especially when sending out copies in answers to requests. The reduction which is done on a Xerox 7000 machine, enables us to copy and distribute the charts with ease.

PART IV

CURRENT DACUM CHARTS

Special Note - Please send copies of any charts you produce to:

W. Sinnett/DEX
Director of Academic Services
Humber College of Applied Arts & Technology,
3199 Lakeshore Blvd. West,
Toronto, Ontario, M8V 1L1

This section does not contain the actual charts - data sheets have been made up and classified into 24 general areas according to the Canadian Classifications and Dictionary of Occupations (CCDO). A special section for Academic Upgrading or Basic Training for Skill Development has been identified with Communications, Math, Science, Life Skills and Student Orientation.

How to Use this Section - (There are two lists for cross reference)

1. The alpha list giving the title of the charts, the developer and a Subject/Designator (S/D) number could be searched to identify titles of interest.

2. Use the S/D number to go to the S/D list. Find the matching S/D number that was identified in the alpha list. You will now see what classification that title has been given and what other related charts exist in the same area.

3. Go to the data sheets to obtain more information on the chart you are interested in. You may have to look through all of the charts in a S/D area to find yours. The information on the charts is a follows:

   a) Subject/Designation

      These are classifications and sub-classifications taken from the CCDO - simply a way of grouping related job fields and occupations.

b) Level

This information pertains to the level at which the program would be offered. In many cases the author has made the best guess possible from the information available. Most charts pertain to Occupational Training. The developers would have to be contacted for more information about prerequisites or entry levels. Numbers in brackets, e.g. (9, 10) indicate grade levels.

c) Title

This is the exact title given to the chart by the developer

d) Date

This is the date the chart was developed. If a date was not provided on the chart and it came from the Prince Edward Island or Nova Scotia area and arbitrary date of 1970 was given (no earlier charts have been identified up to now).

e) By

This is the developer. Where the specific group, branch or division of an institution is not known, the Department of Education or the name of the College is stated. The names in the bibliography of this paper can be matched up with many of the institutional or government names given under "by" on the data sheet.

f) CCDO

Many of these numbers are not stated. This work must be done at a later date by persons fully familiar with how occupations were coded or classified. Where a number is given an attempt has been made to be as specific as was considered prudent with the given information.

g) TPOS

These are the Terminal Performance Objectives or General areas of competence exactly as stated on the chart.

h) Numbers Beside TPOS

Mostly these are two digit numbers. If a three digit number is given and the 1st digit is a zero, ignore it. If the first of three digits given is not a zero this is the number that appeared on the chart. Adjustments will have to be made in future for all TPOS to be coded with two digits only.

4. The TPOS will certainly be of interest to developers, but you may want to get a copy of the actual chart. Names of persons who contributed charts are listed with the bibliography of this paper. Most are not equipped nor have time to send you large numbers of charts. It is suggested that you contact our office for copies of them:

W. Sinnett/DEX
Director of Academic Services
Humber College of A.A. & T.,
3199 Lakeshore Blvd. West,
Toronto, Ontario, M8V 1L1

PLEASE send us new copies of any new charts you develop or obtain. This way we can build up the DEX - DACUM Chart Exchange.

5. Notes have been added in some cases. These are the annotations thought to be useful by the author. You can cut these out as well and glue or staple them to the backs of the appropriate data sheets.

6. CCDO Volumes 1 and 11 are available in French and English at Information Canada Bookshops. In Toronto, the address is 221 Yonge St. Volume 1 is priced at $15.00 and Volume 11 at $10.00. The books are available by mail from Information Canada, Ottawa. (Volume 1 is essential).

7. We cannot assume that all the charts were developed or produced by means similar to those outlined in this paper. That information would have to be obtained from the developer. Where possible, it has been noted on the data sheet whether a DACUM committee or instructor devised the chart.

8. The whole system of listing and classifying the charts was set up mainly to deal with the 238 charts on hand. Changes and refinements are bound to happen. In other words, don't get too "hooked in" to any one particular information or classification system. Hence the reason for the data sheets. Set it up to suit yourself and keep in touch with us for new additions and developments.

List of Subject/Designation Headings and Sub Headings

56

ACADEMIC UPGRADING

Communications
Mathematics
Science
Life Skills
Orientation

AIR TRANSPORT

BASIC SKILL TRAINING

CLERICAL

Accounting
Bookkeeping
Office Machines & EDP Operators
Secretarial
Typing
Stock Clerk
Stenographer
Clerical Related Occupations

CONSTRUCTION

Excavating
Electrical-Power Installing
Floor Covering
Sales
Wire Communications
Other Construction Trades

CREATIVE ARTS

Antiquer
Fine Arts
Performing Arts
Commercial Arts
Writing

EDUCATION AND TRAINING

ENGINEERING TECHNOLOGY

Surveyor
Drafting

FARMING & ANIMAL HUSBANDRY

FISHING

FORESTRY & LOGGING

MANAGEMENT & ADMINISTRATION

MATERIAL & HANDLING

MEDICINE & HEALTH

METAL MACHINING

METAL SHAPING & FORMING

Aircraft Fabricating

MOTOR TRANSPORT

PRINTING

PROCESSING - FOOD,BEVERAGES

REPAIRING & SERVICING

Appliance Service & Repair
Electric/Electronic Repair
Metal Products
Electrical/Electronic Equipment
Precision Instruments
Assembling Textile Products
Mechanics & Repairmen

SALES

Carpeting

SERVICES

Food/Beverage Preparation & Service
Housekeeping
Lodging and Accommodation
Protective Service

SOCIAL SERVICES

WATER TRANSPORT

ACADEMIC UPGRADING

Communications

1.	Academic Upgrading Communications Level 1	Humber College
2.	Academic Upgrading Communications Level 2	Humber College
3.	Academic Upgrading Communications Level 3	Humber College
4.	Academic Upgrading Communciations Level 2	Georgian College
5.	Academic Upgrading Communications Level 3	Georgian College
6.	Academic Upgrading Communications Level 2 and 3	Sask. Newstart
7.	Basic Communications in a Personalized ABE Environment	N.S. Newstart
8.	Basic Communication Skills	Holland College
9.	Communications Profile - Levels 2 and 3	Northern College
10.	Communication Skills - Craft Programs	Lusaka, Zambia
11.	English as a Second Language (EASL)	Humber College
12.	BTSD Communications	AVE, Nova Scotia
13.	BTSD Communications	Dept. of Ed., B.C.
14.	Functional Literacy	N.S. Newstart

Mathematics

15.	Academic Upgrading Math, Level 1	Humber College
16.	Academic Upgrading Math, Level 2	Humber College
17.	Academic Upgrading Math, Level 3	Humber College
18.	Academic Upgrading Math, Level 1	Northern College
19.	Academic Upgrading Math, Level 2 A	Northern College
20.	Academic Upgrading Math Tech Option, Level 2 B	Northern College
21.	Academic Upgrading Math Bus. Option, Level 2 B	Northern College
22.	Academic Upgrading Math, Level 2	Georgian College
23.	Academic Upgrading Math, General Program	Ont. East. CAATS

Mathematics (Continued)

24. BTSD Mathematics	AVE, Nova Scotia
25. BTSD Mathematics	Dept. of Ed., B.C.
26. Basic Math in a Personalized ABE Environment	Nova Scotia Newstart

Science

27. Academic Upgrading Science, Level 1	Humber College
28. Academic Upgrading Science, Level 2	Humber College
29. Academic Upgrading Science, Level 3	Humber College
30. Academic Upgrading Science, Level 2	Georgian College
31. Academic Upgrading Science, Level 3	Georgian College

Life Skills

32. Life Skills	Nova Scotia Dept. of Ed.

Student Orientation

33. Student Orientation	Niagara College

AIR TRANSPORT

34. Commercial Pilot and Instrument Rating	Lusaka, Zambia

BASIC SKILL TRAINING

35. Basic Training Program	Lusaka, Zambia

CLERICAL

Accounting

36. Professional Accountancy Program - Diploma in Accountancy - Part 1	Lusaka, Zambia
37. Professional Accountancy Program - Diploma in Accountancy - Part 2	Lusaka, Zambia
38. Professional Accountancy Program - Diploma in Accountancy - Part 3	Lusaka, Zambia
39. Certificate Program in Accounts and Business Studies	Lusaka, Zambia

Accounting (Continued)

40. Commercial (Accounting)	Northern College
41. Accounting Technology	Holland College
42. Commercial (Accounting)	Humber College

Bookkeeping

43. Bookkeeping	AVE, Nova Scotia
44. Commercial (Bookkeeping)	Northern College
45. Commercial (Bookkeeping)	Humber College

Office Machine, EDP Operators

46. Key Punch Operator	Job Corps
47. Office Machine Operator	Job Corps
48. Duplicating Machine Operator/Office Clerk	Job Corps
49. Commercial (Business Machines)	Humber College

Secretarial

50. Legal Secretary	Holland College
51. Commercial (Stenographic- Take 30)	Humber College
52. Commercial Typing	Northern College

Typing

53. Clerk Typing	AVE, Nova Scotia
54. Clerk Typist	Lusaka, Zambia
55. Typewriting	Humber College
56. Clerk Typist	Job Corps

Stock Clerk

57. Stock Clerk	Job Corps

Stenographic

58. Stenography	AVE. Nova Scotia
59. Stenographic	Voc. Ed., Newfoundland

Clerical Related Occupations

60.	Clerical	AVE, Nova Scotia
61.	Business Careers Program (Manager)	Curr. Dev., B.C.
62.	Test Administrator	Canada Manpower
63.	Test Interpretation	Canada Manpower

CONSTRUCTION

Construction

64.	Carpentry - Joinery	Lusaka, Zambia
65.	Construction Trades Helper	Georgian College

Excavating

66.	Heavy Duty Equipment Operation	AVE, Nova Scotia
67.	Heavy Duty Equipment Operator	Sheridan College

Electrical Power Installing and Repair

68.	Electrical Craft	Lusaka, Zambia
69.	Electrical Craft Program - Term 2	Lusaka, Zambia
70.	Electrical Construction & Maintenance	Nova Scotia Dept. of Ed.
71.	Electrician	Job Corps

Floorcovering

72.	Resilient Flooring Specialist	Humber College
73.	Installation Specialist Technician (Carpeting)	Humber College
74.	Carpet Installation	AVE, Nova Scotia

Sales

75.	Building Materials Sales - Trades	Humber College
76.	Building Materials Sales - Maintenance	Humber College
77.	Building Materials Sales - Painting	Humber College
78.	Building Materials Sales - Carpentry	Humber College
79.	Construction Technology	Holland College

Sales (Continued)

80.	Drywall and Ceiling Erection and Finishing	AVE, Nova Scotia
81.	Oil Burner Repair and Servicing	Nova Scotia Newstart

Wire Communications

82.	Cable Television Serviceman	Humber College

Other Construction Trades

83.	Plumbing - Sheet Metal	Lusaka, Zambia
84.	Trowel Trades	Lusaka, Zambia
85.	Building Supervisor and Foreman in Service Training	Lusaka, Zambia
86.	Industrial Maintenance (Millwright) Mechanic	Northern College
87.	Brick and Stone Mason	Job Corps
88.	Carpenter - Construction	Job Corps
89.	Cement Mason	Job Corps
90.	Gas Appliance Repair	Job Corps
91.	Custodial Maintenance	Job Corps

CREATIVE ARTS

Antiquer

92.	Antiquer	Nova Scotia Newstart

Fine Arts

93.	Leather Handcraft	Nova Scotia Dept. of Ed.
94.	Jewelry Handcraft	Nova Scotia Dept. of Ed.
95.	Pottery Handcraft	Nova Scotia Dept. of Ed.
96.	Machine Knitting Handcraft	Nova Scotia Dept. of Ed.
97.	Sewing and Weaving Handcraft	Nova Scotia Dept. of Ed.
98.	Wood Handcraft	Nova Scotia Dept. of Ed.
99.	Florist Assistant	Job Corps

Performing Arts		
100.	Broadcasting and Film Arts	Lusaka, Zambia
101.	Radio Announcing	AVE, Nova Scotia
Commercial Art		
102.	Commercial Design	Holland College
103.	Photography	Lusaka, Zambia
104.	Commercial and/or Graphic Artist	Job Corps
Writing		
105.	Practical Journalism	Holland College
EDUCATION AND TRAINING		
Education and Training		
106.	Designing a Curriculum (DACUM)	Lusaka, Zambia
107.	Instructional Methods	Holland College
108.	Communication Skills Commercial Teacher Training Program	Lusaka, Zambia
109.	Learner Assistance Monitoring	Nova Scotia Newstart
110.	Professional Counselling (School)	AVE, Nova Scotia
111.	Instructional Materials Centre Technician	Humber College
112.	Learner Evaluation and Activity Development	Holland College
113.	Audio Visual Communications Support for the Learning Environment	Nova Scotia Newstart
114.	Instructors of Individualized Programs	Humber College
115.	Skill Program Development Planning and Implementation	AVE, Nova Scotia
ENGINEERING TECHNOLOGY		
Engineering Technology		
116.	Precision Instrument Technician	Humber College
117.	Electrical Technology	Nova Scotia Dept. of Ed.

Engineering Technology (Continued)

118.	Electronics Technology	Holland College
119.	Industrial Instrumentation Technician	Humber College
120.	Plastics Production Technology	Holland College

Surveying

121.	Property Mapping	Nova Scotia Dept. of Ed.

Draftsman

122.	Draftsman	Job Corps

FARMING AND ANIMAL HUSBANDRY

123.	Farm Business Management Counselling	Holland College
124.	Farm Business Management	Holland College
125.	Cereal and Forage Crops Production	Holland College
126.	Field Vegetables and Tobacco Production	Holland College
127.	Animal Husbandry	Holland College
128.	Farrier Training	Dept. of Ed., B.C.

FISHING

129.	Deckhand Training	Nova Scotia Newstart

FORESTRY AND LOGGING

130.	Softwood Lumber Grading	Northern College
131.	Forestry Filers	Northern College
132.	Primary Forest Harvesting	AVE, Nova Scotia
133.	Cutter/Skidder Operator	Confederation College
134.	Forest Products Scaling	Northern College

MANAGEMENT AND ADMINISTRATION

135.	Skill Program Development Planning and Implementation	AVE, Nova Scotia

Management and Administration (Continued)

136.	Local Government and Band Management for Community Development	Dept. of Ed., B.C.
137.	Principles and Practices of Modern Business	Holland College
138.	Business Management	Holland College
139.	Executive and Administrative Assistant	Holland College

MATERIAL AND HANDLING

140.	Binding and Warehouse	Lusaka, Zambia
141.	General Warehousing Stockroom Work	AVE, Nova Scotia
142.	Warehouseman and Materials Handler	Job Corps

MEDICINE AND HEALTH

143.	Mental Health Care	Humber College
144.	Dental Assisting	Holland College
145.	Physiotherapist Science Course	Lusaka, Zambia
146.	Hospital Orderly	Confederation College
147.	Practical Nursing	Dept. of Ed., B.C.
148.	General Nursing Practice	Yarmouth Nursing School
149.	Pharmacy Assistant	Dept. of Ed., B.C.
150.	Nursing Assistant	Northern College
151.	Occupational Profile - Health Care Aide	Northern College
152.	Child Mental Health Service	Nova Scotia
153.	Health Care Aide	Algonquin College

METAL MACHINING

154.	Machine Shop	Algonquin College
155.	Machinist (Engineering)	Lusaka, Zambia
156.	Automatic Screw Machine Setter/Operator Single Spindle	Humber College
157.	Automatic Screw Machine Setter/Operator Multi Spindle	Humber College
158.	Machine Operator/Machine Set Up Man	Job Corps

METAL SHAPING AND FORMING

159.	Metal Fabrication (Heavy)	Lusaka, Zambia
160.	Welding	Lusaka, Zambia
161.	Welder Fitter	Humber College
162.	Welding Fabrication	Nova Scotia Newstart
163.	Brake Shear and Press Set up Operator	Humber College
164.	Sheet Metal Worker	Job Corps
165.	Welder	Job Corps

Aircraft Fabricating

166.	Airframe Subassembling	AVE, Nova Scotia

MOTOR TRANSPORT

167.	Ambulance Driver Attendant	Holland College
168.	Tractor Trailer Driver	Confederation College
169.	Truck Driver (heavy and light)	Job Corps

PRINTING

170.	Letterpress Machine Printing	Lusaka, Zambia
171.	Monotype Keyboard (Composition)	Lusaka, Zambia
172.	Lithographic Machine Printing	Lusaka, Zambia
173.	Composition Work	Lusaka, Zambia
174.	Offset Printer	Job Corps

PROCESSING - FOOD, BEVERAGE & RELATED OCCUPATIONS

175.	Baker	Job Corps

REPAIRING AND SERVICING

176.	Housing Maintenance Serviceman	Govt. of NWT
177.	Automotive Mechanic	Lusaka, Zambia
178.	Farm Machinery Maintenance	Holland College
179.	Light Metal Fabrication	Lusaka, Zambia
180.	Heavy Equipment Repair	Lusaka, Zambia

Appliance Service and Repair

181.	Appliance Service Repairman	Northern College
182.	Domestic Appliance and Repair Service	Nova Scotia Newstart
183.	Electrical Appliance Repairman	Job Corps

Electrical, Electronic Repair

184.	Electronics - Home Entertainment	Humber College
185.	Electronic Repair	AVE, Nova Scotia
186.	Radio & TV Repair and Maintenance	Lusaka, Zambia

Metal Products

187.	Manufactured Metal Products Assembler/ Fabricator	Humber College
188.	Radio and TV Repairman	Job Corps

Electrical/Electronic Equipment

189.	Electronics Assembler	Job Corps

Precision Instruments

190.	Precision Instrument Technician	Humber College

Assembling Textile Products

191.	Upholstering	AVE, Nova Scotia
192.	Furniture Upholstering	Job Corps

Mechanics and Repairmen

193.	Camera Repair Mechanic	Humber College

Mechanics and Repairmen (Continued)

194.	Fitter (Mechanical Maintenance)	Lusaka, Zambia
195.	Vehicle Body Repair	Lusaka, Zambia
196.	Heavy Duty Equipment Mechanic	Confederation
197.	Heavy Duty Equipment Mechanic	Northern College
198.	Motor Vehicle Repair, Mechanical	Nova Scotia Newstart
199.	Motor Vehicle Repair, Body	AVE, Nova Scotia
200.	Marine and Small Power Equipment Mechanic	Humber College
201.	Photoelectronics	Humber College
202.	Instrumentation Mechanic	Humber College
203.	Air Conditioning Installer	Job Corps
204.	Small Engines Maintenance	Northern College
205.	Industrial Maintenance Mechanic (Packaging)	Humber College
206.	Office Machine Repair	Job Corps
207	Air Conditioning & Refrigeration Mechanic	Job Corps
208.	Small Gas Engine Repair	Job Corps

SALES

209.	Appraisal and Assessment of Real Property	Holland College
210.	General Sales Clerk	AVE, Nova Scotia
211.	Building Supplies Sales	AVE, Nova Scotia
212.	Retail Sales Clerk	Job Corps

Carpeting

213.	Sales Specialist - Carpeting	Humber College
214.	Retail Sales Specialist - Carpeting	Humber College

SERVICES

Food, Beverage, Preparation and Service

215.	Food Preparation Basic	Confederation
216.	Bartending and Service	AVE, Nova Scotia

Food, Beverage Preparation and Service (Continued)	
217. Retail Meatcutting	AVE, Nova Scotia
218. Cook Training	Dept. of Ed., B.C.
219. Dining Waitress/Hostess Service	AVE, Nova Scotia
220. Cooking	Nova Scotia Newstart
221. Food Service & Hotel Administration	Northern College
222. Waiter/Waitress	Dept. of Ed., B.C.
Housekeeping	
223. Trained Homemaker	Dept. of Ed., B.C.
224. Housekeeping - Homemaker Training	Nova Scotia Newstart
Lodging and Accommodation	
225. Hotel-Motel Housekeeping Service	AVE, Nova Scotia
226. Hotel-Motel Restaurant Management	Holland College
Protective Service	
227. Police Technology	Holland College
SOCIAL SERVICE	
228. Recreation Facility Management	Algonquin College
229. Recreation Leadership	Algonquin College
230. Library Administration - Commission Library	Lusaka, Zambia
231. District Management	Information Canada
232. Enquiry- Information Service	Information Canada
233. Mobile Information Service	Information Canada
234. Resources Planning	Holland College
235. Youth Work	Nova Scotia Youth Agency
236. Indigenous Community Work	Continuing Ed., N. Scotia
237. Psychological Counselling	U. of Victoria, B.C.
WATER TRANSPORT	
238. Marine Engineering (Fishing)	AVE, Nova Scotia

ACADEMIC UPGRADING

COMMUNICATIONS

MATHEMATICS

SCIENCE

LIFE SKILLS

STUDENT ORIENTATION

Subject/Designation - COMMUNICATIONS

Level - Adult - Academic Upgrading
Title - Academic Upgrading Communications - Level 1 CCDO# 9617-000

by Humber College 1974

TPOS
1. Word Meaning - use words in context
2. Word analysis - use correct grammatical form of words
3. Listening skills - follow oral directions
4. Literal comprehension - read to extract facts
5. Interpretive comprehension - read to make inferences
6. Speaking skills - communicate orally
7. Writing skills - write sentences
8. Correspondence skills - correspond in everyday matters

Mainly derived from Sask. Newstart Blade and Linc Programs

Subject/Designation - COMMUNICATIONS

Level - Adult Academic Upgrading
Title - Academic Upgrading Communications - Level 2 CCDO# 9603-000

by Humber College 1974

TPOS
1. Listening skills - listen to spoken selections to identify main idea with relevant details
2. Functional reading - read general interest materials
3. Developmental reading - interpret and evaluate printed materials of general interest.
4. Business reading - answer questions relating to forms, charts, manuals
5. Speaking skills - speak in formal and informal situations
6. Writing skills - write compositions
7. Integrated skills - combine communication skills in essays and reports
8. Honours option

Subject/Designation - COMMUNICATIONS

Level - Adult Academic Upgrading
Title - Academic Upgrading Communications - Level 3 CCDO# 9605-000

by Humber College 1974

TPOS
1. Listening skills - listen to everyday speech
2. Reading skills - read various materials
3. Speaking skills - speak with clarity and persuaviness
4. Writing skills - present a clear point of view in a formal essay
5. Integrated skills - combine all skills and resources to research and solve problems
6. Integrated skills, mass media, apply integrated skills to mass media
7. Honours option

Subject/Designation - COMMUNICATIONS

Level - Adult Academic Upgrading
Title - Academic Upgrading Communications - Level 3 CCDO# 9603-000

by Georgian College

TPOS
1. Study skills
2. Word skills
3. Basic writing skills
4. Organizational skills
5. Applied skills
6. Applied reading skills
7. Oral skills
8. Intermediate writing skills
9. Advanced writing skills

Subject/Designation - COMMUNICATIONS

Level - Adult Academic Upgrading
Title - Academic Upgrading Communications - Levels 2 and 3 CCDO#_____

by Sask. Newstart 1972

TPOS
Developmental Reading
1. Word analysis
2. Word meaning
3. Literal comprehension
4. Interpretive comprehension N.B. this is part of the LINC program
5. Evaluative comprehension

Functional Reading
1. Learning skills
2. Structural skills
3. Correspondence skills
4. Media skills

Subject/Designation - COMMUNICATIONS

Level - Adult Academic Upgrading
Title - Basic Communications in a Personalized ABE Environment CCDO#_____

by Nova Scotia Newstart 1970

TPOS
1. Listen to and interpret oral messages and communications
2. Present oral messages and communications
3. Read and interpret written messages and communications
4. Prepare written messages
5. Apply non verbal communication techniques
6. Communicate effectively in work and other roles
7. Communicate using interpersonal skills
9. Use communication devices and systems
10. Utilize information systems and resources

Subject/Designation - COMMUNICATIONS

Level - Adult
Title - Basic Communication Skills CCDO# 9600-000

by Holland College 1974

TPOS
1. Comprehend reading materials
2. Gather and organize information
3. Construct sentences and paragraphs
4. Compose letters, reports and essays
5. Apply listening techniques
6. Participate in group functions
7. Communicate orally
8. Develop spelling and vocabulary improvement skills

Subject/Designation - COMMUNICATIONS

Level - Adult
Title - Communications Profile - Levels 2 and 3 CCDO# 9601-000

by Northern College 1973

TPOS
1. Listen to extract information and meaning
2. Argue forceully using proofs
3. Address a group and participate in group discussions
4. Read technical, vocational and general interest materials
5. Write multi paragraph passages
6. Write letters and reports
7. Anaylse and evaluate the content and structure of articles, essays, etc.

Subject/Designation - COMMUNICATIONS

Level - Adult
Title - Communication Skills - Craft Programs CCDO# 9600-000

by Lusaka, Zambia 1971

TPOS
1. Listening
2. Speaking
3. Reading
4. Writing
5. Vocabulary building

Subject/Designation - COMMUNICATIONS

Level - Adult
Title - English as a Second Language (EASL) CCDO# 9161-000

by Humber College 1974

TPOS
1. Knowledge of transforms with all items, sentence patterns taught
2. Sentence patterns
3. Listen, acceptably speak, write and spell names, addresses, vocabulary words and items taught
4. Orally acceptable discussion re Canadian geography, history, civics,
5. To determine students place within curriculum course, "streaming"
6. Listen, write, form & speak all items and patterns 1 to 7,oral acceptance, module 1

(continued on next page)

Subject/Designation - COMMUNICATIONS

Level - Adult
Title - English as a Second Language (Continued from previous page)

TPOS
7. Minimal fluency in all items and patterns taught less 60% -repeat Module 1
8. Fluency in all items taught possible certification - test module III- 60% required.
9. Acceptable fluency in all items formation of original thoughts.

Notes: TPO 005 is a diagnostic placement type test while 006-009 make up the 4 main components (modules) of the course. TPO 001- 004 outline the basic structure skills and content for 06-09.

This course is an adaptation of the Canadian Civil Service Program.

Subject/Designation - COMMUNICATIONS

Level - Adult
Title - BTSD Communications CCDO#_____
by AVE, Nova Scotia 1973

TPOS
1. Readiness
2. Identifying, pronouncing and writing symbols in words
3. Spelling words by syllables and rules
4. Pronouncing, spelling and defining words
5. Reading with effeciency and comprension
6. Identify structure and meaning of sentences
7. Writing clear, concise sentences
8. Identifying meaning of paragraphs and compositions
9. Writing clear concise paragraphs and compositions
10. Locating specific information
11. Practical application of writing
12. Listening
13. Speaking

Subject/Designation - COMMUNICATIONS

Level - Adult
Title - BTSD Communications CCDO#_____
by Dept. of Ed., B.C. 1973

TPOS
1. Listen to and interpret oral communication
2. Communicate orally
3. Listen to, observe and interpret film and television
4. Read and interpret written communication
5. Communicate in writing
6. Study effectively

Subject/Designation - COMMUNICATIONS

Level - Adult
Title - Functional Literacy CCDO#_____

by Nova Scotia Newstart 1971

TPOS

1. Speak - enunciate and pronounce
2. Speak - express and describe
3. Communicate non verbally - project
4. Communicate non verbally - interpret
5. Listen - extract information and meaning
6. Listen - attend - tune in
7. Read - decode symbolic materials
8. Read - comprehend symbolic materials
9. Read - find and organize information for utilization
10. Write - write and letter
11. Write - construct components
12. Write - compose complete selections

NB - Funcational Literacy chart is not a DACUM chart as such. It is an analysis of basic language or a subject taxonomy which can be used to develop any basic communications program.

Subject/Designation - MATHEMATICS

Level - Adult
Title - Academic Upgrading Math, Level 1 CCDO# 9617-000
by Humber College 1974

TPOS
1. Perform operations with whole numbers
2. Perform operations with fractions
3. Perform operations with decimals
4. Solve percent problems
5. Solve measurement problems
6. Solve perimeter, area and volume problems

Subject/Designation - MATHEMATICS

Level - Adult
Title - Academic Upgrading Math, Level 2 CCDO# 9603-000
by Humber College 1974

TPOS
1. Perform basic operations with whole numbers
2. Perform basic operations with fractions
3. Perform basic operations with decimals
4. Solve percent problems
5. Solve perimeter, area and volume problems
6. Solve problems involving ratio and proportion
7. Perform operations with signed numbers
8. Calculate using scientific notations
9. Perform operations with algebraic terms
10. Solve linear equations
11. Rearrange formula
12. Draw and analyze graphs
13. Solve geometric problems
14. Solve systems of linear equations
15. Perform basic oeprations with polynomials
16. Solve word problems algebraically

Subject/Designation - MATHEMATICS

Level - Adult
Title - Academic Upgrading Math, Level 3 CCDO#9605-000
by Humber College 1974

TPOS
1. Factor polynomials
2. Perform operations usingpowers
3. Perform basic operations with radicals
4. Solve problems involving righ triangles and vectors
5. Solve problems inovlving oblique triangles
6. Solve problems dealing with lines
7. Perform calculations using logarithms
8. Perform basic operations with rational algebraic expressions
9. Solve inequalities and non linear equations.
10. Apply set terminology concepts and principles to problem solving
11. Draw and analyze graphs of relations and functions
12. Solve quadratic equations
13. Draw and analyze graphs of quadratic functions
14. Draw and analyze graphs of sine functions
15. Solve analytic geometry problems
16. Solve word problems algebraically

Subject/Designation - MATHEMATICS

Level - Adult
Title - Academic Upgrading Level 1 CCDO# 9601-000

by Northern College 1974

TPOS
1. Whole number review
2. Solve fractions problems
3. Solve decimals problems
4. Solve percentage problems
5. Solve square root problems
6. Solve metric system problems
7. Solve practical measure problems
8. Solve area problems
9. Calculate volume
10. Computate consumer applications

Subject/Designation - MATHEMATICS

Level - Adult
Title - Academic Upgrading Level 11A CCDO# 9603-000

By Northern College 1974

TPOS
1. Basic math review
2. Algebraic notation problems
3. Solve signed numbers problems
4. Solve algebraic multiplication problems
5. Solve algebraic division problems
6. Solve algebraic equations problems
7. Solve ratio, proportion andpercentage problems
8. Solve basic mensuration problems

Subject/Designation - MATHEMATICS

Level - Adult
Title - Academic Upgrading Technical Option Level 113 CCDO# 9603-000

by Northern College 1974

TPOS
1. Solve mensuration problems
2. Solve metric systems problems
3. Compute ratio, proportion and percent
4. Calculate interest
5. Calculate banking and borrowing transactions
6. Compute arithmetic problems for retailing
7. Calculate commissions
8. Compute profit and loss transactions

Subject/Designation - MATHEMATICS

Level - Adult
Title - Academic UPgrading Business Option Level 11B CCDO# 9603-000

by Northern College 1974

TPOS
1. Solve mensuration problems
2. Solve geometry problems
3. Solve trigonometry problems
4. Review basic algebra

(continued on next page)

Subject/Designation - MATHEMATICS

Level - Adult
Title - Academic Upgrading Business Option Level 11B (Continued from previous page)

by Northern College

TPOS
5. Solve word problems, one unknown
6. Solve equations - two unknowns
7. Solve equation graphs problems
8. Computate ratio, proportion and percentage
9. Draw and solve regular graph problems
10. Solve factoring problems - all types

Subject/Designation - MATHEMATICS

Level - Adult
Title - Academic Upgrading Math - Level 2 CCDO# 9603-000

by Georgian College 1973

TPOS
1. Computational skills
2. Measurements
3. Integers and rationals
4. Introductory algegra
5. Perimeter, area, volume
6. Algebra 11
7. Statistics
8. Word problems
9. Geometry

Subject/Designation - MATHEMATICS

Level - Adult
Title - Academic UPgrading General Program CCDO# 9603-000

by Ontario Eastern Region CAATs 1973

TPOS
1. Solve arithmetic problems - whole numbers
2. Solve arithmetic problems - fractions
3. Solve arithmetic problems - decimals
4. Solve arithmetic problems - percent
5. Solve mensuration problems
6. Solve geometry problems
7. Solve analytic geometry problems
8. Solve algebraic problems
9. Solve trigonometry problems

Subject/Designation - MATHEMATICS

Level - Adult
Title - BTSD Mathematics CCDO#_____

by AVE, Nova Scotia

TPOS
1. Reading and Writing
2. Adding
3. Subtracting
4. Multiplying
5. Dividing
6. Solving problems
7. Accounting
8. Drawing and measuring
9. Calculating by formulae

Subject/Designation - MATHEMATICS

Level - Adult
Title - Basic Math in a Personalized ABE Environment CCDO#_____

by Nova Scotia Newstart 1970

TPOS
1. Perform basic math computations
2. Recognize and apply math to problems
3. Plan, account and control using math
4. Communicate using math
5. Interpret tables, data, graphs
6. Convert math systems
7. Use calculating devices
8. Measure with instruments and math
9. Audit, check and verify
10. Estimate and perform rapid mental calculations

Subject/Designation - MATHEMATICS

Level - Adult
Title - BTSD Mathematics CCDO#_____

by Dept. of Ed., B.C. 1972

TPOS
1. Solve problems using addition, subtraction, multiplication and division of whole numbers
2. Solve problems using additions, subtraction, multiplication and division of fractions
3. Solve problems using ratio and proportions
4. Solve problems using addition, subtraction , multiplication and division of decimals
5. Solve problems involving percent
6. Solve problems involving roots and powers
7. Solve problems involving measurement of time, distance, weight, area and volume (imperial and metric)
8. Solve problems using geometry
9. Solve problems using graphs
10. Solve problems using algebra
11. Solve problems using trigonometry
12. Read, interpret and apply statistics
13. Apply math to business problems
14. Use calculating devices and math tables

Subject/Designation - SCIENCE

Level - Adult
Title - Academic Upgrading Science - Level 1 CCDO# 9601-000

by Humber College 1974

TPOS
1. Analyze a problem
2. Obtain information from various sources
3. Organize the data obtained
4. Interpret observations and measurements

N.B. - this chart is a matrix. TheTPOS listed above state the simple learning processes while specific skills in science are listed across the top of the chart, i.e. observation, classifications, space time relationsips, using numbers, communicating measuring, infering predicting

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Subject/Designation - SCIENCE

Level - Adult
Title - Academic Upgrading Science - Level 2 CCDO# 9603-000

by Humber College 1974

TPOS
1. Develop scientific attitude
2. Identify the problem
3. Analyze the problem
4. Obtain information from various sources
5. Organize the data obtained
6. Interpret organized data
7. Test the hypotheses
8. Formulate a conclusion

N.B. - this chart is a matrix. The TPOS listed above state the generic academic skills or key thinking problem solving processes required while specific content related skills are listed across the top of the chart: i.e., nature of scientific inquiry, atomic structure (basic), bonding (basic), Matter (basic), cellular introduction, ecology, human systems, simple energy forms, elementary mechanics,options are noted

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Subject/Designation - SCIENCE

Level - Adult
Title - Academic Upgrading Science - Level 3 CCDO# 9605-000

by Humber College 1974

TPOS
1. Develop scientific attitude
2. Identify the problems
3. Analyze the problem
4. Obtain information from various sources
5. Organize data obtained
6. Interpret organized data
7. Test the hypotheses
8. Formulate a conclusion

N.B. (see N.B. in Level 2)

Subject/Designation - SCIENCE

Level - Adult
Title - Academic UPgrading Science - Level 2 CCDO# 9603-000

by Georgian College 1974

TPOS
1. Introduction to science
2. Biology
3. Measurements
4. Basic Chemistry
5. Electricity
6. Mechanics
7. Heat
8. Sound
9. Light

Subject/Designation - SCIENCE

Level - Adult
Title - Academic Upgrading Science - Level 3 CCDO#9605-000

by Georgian College 1974

TPOS
1. Mechanics
2. Electricity
3. Electronics
4. Nuclear physics
5. Light - Level 2
6. Heat - Level 2

Subject/Designation - SCIENCE

Level - Adult
Title - BTSD Science CCDO#_____

by Dept. of Ed., B.C.

TPOS
1. General Science - Relate and apply principles of life, health and physical science to ones environment
2. Physics - conduct experiments and solve problems involving heat,light, sound
3. Physics - conduct experiments and solve problems involving applied mechanics
4. Physics - conduct experiments and solve problems involving magnetism and electricity
5. Chemistry - conduct experiments and solve problems involving applied chemistry
6. Biology - to relate function to structure in animals with emphasis on man
7. Biology - to relate functionto structure in plants
8. Biology - apply principles of ecology to mans place in the world
9. Biology - apply principles of genetics and evolution
10. Define and apply scientific method (integrated throughout program)

N.B. core is general science - physics, chemistry and biology are options as required. Uses tracks instead of behavioural definitions or tasks

Subject Designation - LIFE SKILLS

Adult - Adult
Title - Life Skills CCDO#_____

by Nova Scotia Dept. of Ed 1970

TPOS
1. Maintain living environment
2. Lead a constructive home life
3. Participate and fit into the community
4. Lead a constructive working life
5. Manage personal finances
6. Be a wise consumer
7. Practice and contribute to social order
8. Use community resources and services
9. Continually change and develop
10. Maintain personal well being
11. Communicate effectively
12. Use math effectively

Subject/Designation - STUDENT ORIENTATION

Level - Adult
Title - Student Orientation CCDO#_____

by Niagara College 1974

TPOS
1. School organization and regulations
2. Physical plan orientation
3. Learning resources and materials
4. Placement testing
5. Learning environment
6. Counselling orientation
7. Health orientation
8. Classroom integration
9. Evaluation

AIR TRANSPORT

Subject/Designation - AIR TRANSPORT

Level - Occupational Training
Title - Commercial Pilot and Instrument Rating CCDO# 9111-118

83.

by Technical Services Branch, Lusaka, Zambia 1971

TPOS

1. Personal and vocational adjustment
2. Safety and accident prevention
3. Air law flight rules and regulations
4. Flight planning
5. Navigation general
6. Navigation plotting
7. Meteorology
8. Air frames and engines
9. Radio practices and navigation aids
10. Pilot navigation
11. Instrument flying
12. Night flying
13. Trade math and science
14. Sketching and blueprint reading
15. Communication skills

BASIC SKILL TRAINING

Subject/Designation - BASIC SKILL TRAINING

Level - Occupational Training
Title - Basic Training Program OCDO# 9610-000

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Electrical
2. Construction
3. Metal
4. Power
5. Wood

CLERICAL

ACCOUNTING

BOOKKEEPING

OFFICE MACHINE/
EDP OPERATORS

SECRETARIAL

TYPING

STOCK CLERK

STENOGRAPHER

RELATED OCCUPATIONS

Subject/Designation - CLERICAL- ACCOUNTING

97

Level - Occupational Training
Title - Professional Accountancy Program - Diploma in Accountancy - Part 1

by Technical Services Branch, Lusaka, Zambia 1971 CCDO#1171

TPOS
1. Accountancy - 1 - 400 hours
2. Management 1 - 240 hours
3. Law 1 - 240 hours
4. Costing
5. Economics
6. Statistics - 60 hours
7. Taxation

Subject/Designation - CLERICAL - ACCOUNTING

Level - Occupational Training
Title - Professional Accountancy Program - Diploma in Accountancy - Part 2

by Technical Services Branch, Lusaka, Zambia 1971 CCDO# 1171

TPOS
1. Accountancy 11 - 400 hours
2. Management 11 - 240 hours
3. Law 11 - 240 hours
4. Costing 1 - 240 hours
5. Economics
6. Statistics
7. Taxation
8. Auditing

Subject/Designation - CLERICAL - ACCOUNTING

Level - Occupational Training
Title - Professional ACcountancy Program - Diploma in Accountancy - Part 3

by Technical Services Branch, Lusaka, Zambia 1971 CCDO# 1171

TPOS
1. Accountancy - 111 - 400 hours
2. Management 111 - 200 hours
3. Law
4. Costing 111-200 hours
5. Economics
6. Statistics
7. Taxation - 80 hours
8. Auditing - 240 hours

Subject/Designation - CLERICAL - ACCOUNTING

Level - Occupational Training
Title - Certificate Program in Accounts and Business Studies CCDO# 4131-000-02

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Communications in business
2. Bookkeeping and accounts
3. General principles of law
4. Office organization and administration
5. Economics
6. Commerce
7. Business calculations

Subject/Designation - CLERICAL - ACCOUNTING

Level - Occupational Training
Title - Commercial (Accounting) CCDO#

by Northern College 1972

TPOS
1. Complete all accounting work, through the accounting cycle
2. File alphabetically and numerically use various office machines and communicate on general business administration
3. Communicate effectively in the work environment
4. Type business forms and letters
5. Solve problems in business math
6. Prepare financial statements
7. Relate the techniques of marketing research
8. Describe the development and types of law.
9. Solve problems in business math
10. Compile and analyze economic data and apply economic principles

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Subject/Designation - CLERICAL - ACCOUNTING

Level - Occupational Training
Title - Commercial (accounting) CCDO# 4131-000-01

by Humber College 1974

TPOS
1. Complete the elementary accounting cycle
2. Complete the basic accounting cycle
3. Complete practical work
4. Complete the integrated accounting cycle
5. Complete financial statements
6. Prepare financial statements

Subject/Designation - CLERICAL - ACCOUNTING

Level - Occupational Training
Title - Accounting Technology CCDO#

by Holland College 1973

TPOS
1. Manage government taxation and levy returns
2. Operate accounting systems
3. Prepare and analyze financial reports
4. Utilize business machines and computers
5. Apply business math and statistical calculations for accounting purposes
6. Communicate information
7. Identify business law
8. Participate in managerial functions
9. Apply economics to business decisions
10. Practice human relations in business

Subject/Designation - CLERICAL - BOOKKEEPING

Level - Occupational Training
Title - Bookkeeping CCDO# 4131-114

by AVE, Nova Scotia

TPOS
1. Communicate in the work environment
2. Perform general office duties
3. Operate standard office machines and devices
4. Perform basic bookkeeping tasks
5. Complete and control standard forms
6. Operate and maintain filing systems and devices
7. Prepare and record payrolls

Subject/Designation - CLERICAL - BOOKKEEPING

Level - Occupational Training
Title - Commercial (Bookkeeping) CCDO# 4131

by Northern College 1972

TPOS
1. Complete all bookkeeping through the bookkeeping cycle
2. File alphabetically and numerically and use various office machines and communicate on general business administration.
3. Operate business machines and solve problems using business math.
4. Communicate effectively in the work environment.
5. Type mailable business forms and letters.

Subject/Designation - CLERICAL - BOOKKEEPING

Level - Occupational Training
Title - Commercial (Bookkeeping) CCDO# 4141-110

by Humber College 1974

TPOS
1. To prepare simple coordinated financial statements
2. To complete basic accounting cycle
3. To prepare payroll and petty cash journals and bank reconciliations
4. To complete a practice set - representing the basic accounting cycle of a service business
5. To record transactions in special and multi column journals
6. To complete a practice set representing the basic accounting cycle of a trading business

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Subject/Designation - CLERICAL - OFFICE MACHINE EDP EQUIPMENT OPERATORS

Level - Occupational Training
Title - Key Punch Operator CCDO# 4143 - 134

by Job Corps 1969

TPOS
1. Utilize understanding of punched card terminology and abbreviations
2. Identify card punch operative parts and features
3. Identify, state function, and operate control switches
4. Identify, state function, and operate control and special punching keys
5. Identify and operate alphabetic and numeric keyboards
6. Prepare key punch for operation
7. Perform key punch operations

Note - the speeds below have errors deducted and are based on material without automatic duplication

Numeric punching - 6000-7000 strokes - 1 hour
Alphanumeric punching - 6000-7000 strokes - 1 hour
Alphabetic punching - 6000-7000 strokes - 1 hour

Subject/Designation - CLERICAL - OFFICE MACHINE EDP EQUIPMENT OPERATORS

Level - Occupational Training
Title - Office Machine Operator CCDO# 4141

by Job Corps 1969

TPOS
1. Operate various types of adding machines
2. Operate calculators
3. Operate billing machines
4. Operate sorting machines
5. Operate tabulating machines
6. Operate mail preparing and mail handling machinery
7. Operate mail opening, folding, stuffing, embossing and checkwriting machines
8. Operate postage meter

Subject/Designation - CLERICAL - OFFICE MACHINE EDP OPERATORS

Level - Occupational Training
Title - Duplicating Machine Operator - Office Clerk CCDO# 4141-146

by Job Corps 1969

TPOS
1. Apply safety procedures in operating and maintaining duplicating equipment
2. Perform and understand various duplicating, copying procedures
3. Keep records of work produced, collate duplicated pages and order supplies for machines.
4. Follow directions, understand and perform general clerical duties
5. Operate office duplicating equipment.

Subject/Designation - CLERICAL - BUSINESS MACHINES

Level - Occupational Training
Title - Commercial (Business Machines) CCDO# 4141-110

by Humber College 1974

TPOS
1. To operate office calculators
2. To complete calculator projects
3. To operate posting machines
4. To operate a key punch at 8000 keystrokes per hour

Subject/Designation - CLERICAL - SECRETARIAL

Level - Occupational Training
Title - Legal Secretary CCDO# 4111-118

by Holland College 1973

TPOS
1. Communicate effectively and develop personal competence
2. Operate business machines
3. Set up and maintain filing systems
4. Perform basic bookkeeping functions
5. Type and transcribe
6. Select and prepare property transaction documentation
7. Complete litigation documentation
8. Complete estate documents
9. Complete commercial documentation
10. Organize and prepare written communcation
11. Organize and manage office

Subject/Designation - CLERICAL - SECRETARIAL

Level - Occupational Training
Title - Commercial (Typing) CCDO# 4111

by Northern College 1972

TPOS
1. Type mailable letters, business forms, reports, minutes
2. Write accurately in shorthand and transcribe all business letters, messages, minutes, reports, etc.
3. Communicate effectively in the work environment
4. Perform various duties of secretary or clerk typist
5. File alphabetically and numerically office correspondence, Use various office machines and communicate on general business administration
6. Use the combination journal in any form and post any number of transactions. Prepare financial statements
7. Operate most common business machines. Solve problems in business math

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Subject/Designation - CLERICAL - STENOGRAPHER

Level - Occupational Training
Title - Commercial (Stenographic) CCDO# 4111-118

by Humber College 1974 (Shorthand - Take 30)

TPOS
1. Demonstrate comprehensive mastery of the theory of take 30 shorthand with 80% accuracy
2. Transcribe business letters fromsight dictation at 60 WPM with 90% accuracy
3. Produce mailable letters from sight dictation at 80 WPM with 90% accuracy
4. Produce mailable business letters from sight dictation at 100 WPM with 100% accuracy
5. Produce mailable business letters from sight dirtation at 120 WPM with 90% accuracy

Subject/Designation - CLERICAL - STENOGRAPHY

Level - Occupational Training
Title - Stenography CCDO# 4111-118

by AVE, Nova Scotia

TPOS
1. Type business correspondence
2. Transcribe dictation
3. Operate filing system
4. Perform general office tasks
5. Operate standard office machines
6. Keep financial and statistical records
7. Communicate in the work environment

Subject/Designation - CLERICAL - STENOGRAPHY

Level - Occupational Training
Title - Stenographer CCDO# 4111

by Division of Vocational Education, Newfoundland

TPOS
1. Operate business machines
2. Type from straight copy 5 minutes
3. Produce typed material
4. Take dictation and type mailable material from shorthand notes
5. Maintain correspondence and files
6. Compose and type written communications
7. Participate in general office functions
8. Perform basic bookkeeping functions
9. Communicate effectively and develop personal competence

Subject/Designation - CLERICAL - STOCK CLERK

Level - Occupational Training
Title - Stock Clerk CCDO# 4155-126

by Job Corps 1969

TPOS
1. Maintain neat and accurate records and files
2. Receive count, sort and weigh incoming stock
3. Receive items (verify) and examine for conformation to specifications
4. Determine identifying information (size, etc.) and mark identifying codes on merchandise
5. Determine methods of storage, stock location and stock store
6. Adjust and repair articles in stock as necessary
7. Fill orders from stock on hand and cut stock to size if necessary
8. Requisition articles as necessary to fill incoming orders
9. Prepare stock inventory and distribute stock as necessary
10. Maintain record keeping on stock

Subject/Designation - CLERICAL- CLERICAL RELATED OCCUPATIONS

Level - Occupational Training
Title - Clerical CCDO# 4197-114

by AVE, Nova Scotia

TPOS
1. Operate standard office machines
2. Communicate in work environment
3. Operate filing systems
4. Calculate and verify accounts and data
5. Perform general office tasks
6. Maintain records
7. Perform related duties

Subject/Designation - CLERICAL - CLERICAL RELATED OCCUPATIONS

Level - Occupational Training
Title - Business Careers Program CCDO# 1149-126

by Post Secondary Curriculum Development B.C.

TPOS
1. Typing, dicta typing, filing, record keeping
2. Mail services, receptionist duties, duplicating equipment
3. Business communication
4. Business arithmetic
5. Adding machines and calculators, bookkeeping
6. Payroll and payroll costing
7. Accounting fundamentals, commercial law
8. Math of finance
9. Introduction to data processing

Subject/Designation - CLERICAL - CLERICAL RELATED OCCUPATIONS

Level - Occupational Training
Title - Test Administrator CCDO# 4199

by Canada Manpower Counselling and Testing Division 1974

TPOS
1. Personal Skills
   a) relating to people
   b) observation skills
   c) adaptability
   d) self confidence
   e) language usage
2. Organization and operations
   a) organizational structure
   b) aims and objectives
   c) communication channels
   d) supply management
   e) regulations

Subject/Designation - CLERICAL- CLERICAL RELATED OCCUPATIONS

Level - Occupational Training
Title - Test Administrator (Continued from previous page)

TPOS (Continued)

3. Statistical Knowledge
   a) basic statistics
   b) conversion tables

4. Testing knowledge
   a) test development
   b) physical environment
   c) scoring - manually or by machine
   d) the GATB
   e) purpose of testing
   f) invalidated results
   g) organization of people and tests
   h) interest inventory
   i) proficiency tests

5. Information Flow
   a) document flow
   b) filing systems
   c) planning and scheduling

6. Standards
   a) orientation to standards
   b) ethical standards
   c) performance standards

Subject/Designation - CLERICAL CLERICAL RELATED OCCUPATIONS

Level - Job Training
Title - Test Interpretation CCDO# 4199

by Canada Manpower Counselling and Testing Division 1974

TPOS

1. Statistical Knowledge
   a) frequency distribution
   b) graphs
   c) measure of central tendency
   d) correlation
   e) measures of dispersion
   f) reliability
   g) validity
   h) transformations

2. Testing knowledge
   a) purpose of testing
   b) rationale for testing
   c) test development
   d) types of tests
   e) contaminating factors

   scoring - manual or machine

3. DMI Authorized Tests
   a) aptitude test - GATB
   b) intelligence - non verbal
   c) interest inventory
   d) proficiency tests
   e) sensory test - colour discrimination

4. PRE Test Planning
   a) test referral
   b) departmental policy and procedures
   c) client preparation

5. Post test - Planning and Interview
   a) test data analysis
   b) client data integration
   c) counselling tools - testing
   d) test interpretation
   e) counsellor notes, interview, report

6. Standards
   a) introduction to standards b) ethical standards c) performance standards

CONSTRUCTION

EXCAVATING

ELECTRICAL/ELECTRONIC REPAIR

FLOOR COVERING

SALES

WIRE COMMUNICATIONS

OTHER CONSTRUCTION TRADES

Subject/Designation - CONSTRUCTION

Level - Occupational Training
Title - Carpentry - Joinery CCDO# 8781-110

by Technical Services Branch, Lusaka, Zambia

TPOS
1. Personal and vocational adjustment
2. Safety and accident prevention
3. Care and use of hand tools and machines
4. Manufacture and application of materials
5. Frame construction
6. Timber roof construction
7. Form work construction
8. Wooden stair construction
9. Temporary timber structures
10. Trade, math and science
11. Blueprint reading and sketching
12. Communication skills

Subject/Designation - CONSTRUCTION

Level - Occupational Training
Title - Construction Trades Helper CCDO#

by Georgian College 1973

TPOS
1. Introduction
2. Masonry
3. Carpentry
4. Plumbing materials
5. Drainage
6. Concrete finishing

Subject/Designation - CONSTRUCTION

Level - Occupational Training
Title - Heavy Duty Equipment Operation CCDO# 8711

by AVE, Nova Scotia 1973

TPOS
1. Perform related operator duties
2. Communicate effectively
3. Care for machines and use related hand tools
4. Operate dozers, scrapers, loaders, graders and compactors
5. Operate asphalt equipment
6. Operate back hoes and shovels
7. Operate crushing and drilling equipment
8. Operate on and off highway trucks
9. Operate hoisting equipment
10. Operate concrete mixing and handling equipment

Subject/ Designation - CONSTRUCTION

Level - Occupational Training
Title - Heavy Duty Equipment Operator CCDO# 8711

by Sheridan College 1974

TPOS
1. Communicate effectively
2. Perform related operator duties
3. Operate wheel trencher
4. Operate bulldozer and load of crawler and rubber tire type
5. Operate motor scraper
6. Operate grader
7. Operate combination loader - backhoe and gradeall type machine
8. Operate side boom and a side boom dozer

n.b. - developed by a DACUM committee

Subject/Designation - CONSTRUCTION - ELECTRICAL/ELECTRONIC REPAIR

Level - Occupational Training
Title - Electrical Craft CCDO# 8733

by Technical Services Branch, Lusaka, Zambia

TPOS
1. Personal and vocational adjustment
2. Workshop practice
3. Installing conduit fittings and trunking
4. Installing wire and cable
5. Theory
6. Installing motors and generators
7. Install electrical protective and control equipment
8. Safety and accident prevention
9. Maintenance of electrical equipment
10. Lighting, heating and air conditioning
11. Sketching and blueprint reading
12. Applied mathematics
13. Line work for power distribution
14. Electrical code
15. Rigging
16. Repairing and servicing motors, generators

Subject/Designation - CONSTRUCTION - ELECTRICAL/ELECTRONIC REPAIR

Level - Occupational Training
Title - Electrical Craft Program - Term 2 CCDO# 8733

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Safety and accident prevention
2. Measurement
3. Blueprint reading and sketching
4. Rigging 1

Subject/Designation - CONSTRUCTION - ELECTRICAL/ELECTRONIC REPAIR

Title - Electrical Craft Program - Term 2 (Continued from previous page)

TPOS (Continued)
5. Electricity
6. Batteries
7. Conduct trunking and cable trays
8. Conductors, cables and accessories
9. Service control and protective devices
10. Motors and generators
11. Electricity - Illumination
12. Electricity - conversion
13. Electricity - fault finding
14. Service entrance and distribution panel
15. Electricity - motor contr. equipment and protective devices
16. A.C. Theory
17. Power factor improvement
18. Appliance installation and servicing
19. Linework for power distribution

Subject/Designation - CONSTRUCTION - ELECTRICAL/ELECTRONIC REPAIR

Level - Occupational Training
Title - Electrical Construction and Maintenance CCDO# 8733-122

by Nova Scotia Dept. of Ed. 1972

TPOS
1. Communicate effectively
2. Interpret electrical drawings and specs.
3. Interpret codes
4. Make electrical circuit calculations
5. Test, analyze and trouble shoot systems and equipment
6. Install and maintain motors and generators
7. Install materials and equipment
8. Make joints and connections
9. Install power distribution systems
10. Wire residential and small buildings
11. Use and maintain tools and equipment
12. Work safely

Subject/Designation - CONSTRUCTION - ELECTRICAL/ELECTRONIC REPAIR

Level - Occupational Training
Title - Electrician CCDO# 8733

by Job Corps 1969

TPOS
1. Use safety procedures
2. Use and maintain common and special tools and test measuring equipment
3. Minimize waste of materials
4. Apply principles of electricity
5. Use and understand electrical circuit diagrams

Subject/Designation - CONSTRUCTION - ELECTRICAL/ELECTRONIC REPAIR

Level - Occupational Training
Title - Electrician (Continued from previous page) CCDO# 8733

by Job Corps

TPOS
6. Apply national electrical code
7. Estimate costs
8. Install electrical hardware
9. Test installed circuitry
10. Maintain electrical controls

Subject/Designation - CONSTRUCTION - FLOOR COVERINGS

Level - Occupational Training
Title - Resilient Flooring Specialist CCDO# 8782

by Humber College 1973

TPOS
1. Communicate effectively
2. Estimate quantities and purchases
3. Sell resilient flooring materials
4. Analyze job and recommend installation techniques
5. Recommend repair and maintenance procedures
6. Advise architectural specifier
7. Coordinate and expedite job installation

Note - this and 3 other related charts have been combined for post secondary programs: installation specialist technician (Carpeting)
retail sales specialist (Carpeting)
sales specialist (Carpeting)

produced by a DACUM committee

Subject/Designation - CONSTRUCTION (FLOORCOVERING)

Level - Occupational Training
Title - Installation Specialist Technician (Carpeting) CCDO# 8799

by Humber College 1973

TPOS
1. Communicate effectively
2. Make calculations re estimates, layouts, costing
3. Use all tools related to installation
4. Identify carpet constructions
5. Perform work room activities
6. Make installations and repairs, domestic and commercial
7. Identify and select appropriate accessories
8. Make recommendations re methods, installation and accessories

Subject/Designation - CONSTRUCTION (FLOORCOVERING)

Level - Occupational Training
Title - Carpet Installation CCDO# 8799

by AVE, Nova Scotia 1973

TPOS
1. Fringe and bind
2. Layout carpet installation
3. Seam carpets
4. Use and repair tools
5. Stretch carpet
6. Install carpet
7. Identify with customer and employer
8. Read blueprints, estimate and measure
9. Evaluate and prepare job site
10. Identify materials
11. Repair and spot clean carpets

Subject/Designation - CONSTRUCTION -SALES

Level - Occupational Training
Title - Building Materials Sales - Chart 1 Trades CCDO# 8799

by Humber College 1973

TPOS
1. Interpret terms, symbols, dimensions and drawings in blueprints
2. Masonry - locate, level, prepare and pour concrete footings for dwellings
3. Masonry - select blocks, mix mortar and lay required courses for foundation
4. Plastering - tape and plaster all joints between gyproc panel
5. Tiling - install ceiling tiles
6. Laying of floor and wall tiles
7. Electrical - design a basic service and install additional fix
8. Plumbing - design a basic service and replace fixtures
9. Carpet installation
10. Install eves and reflect forced air in basement
11. Prepare mix, pour and finish front walk and entrance steps
12. Accounting - student finesses in public relations, merchandise and display and sales procedure

note - this program prepares students for home maintenance and selling of home building materials and tools - instructor developed

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Subject/Designation - CONSTRUCTION - SALES

Level - Occupational Training
Title - Building Materials Sales - Maintenance - Chart 2

By Humber College 1973

TPOS
continued on following page

Subject/Designation - CONSTRUCTION - SALES

Title - Building Materials Sales - Maintenance - Chart 2 (continued from previous page)

TPOS
1. Maintain basement
2. Maintain windows and doors
3. Maintain wall, ceiling and floors
4. Maintain plumbing
5. Maintain electricity
6. Maintain roof
7. Maintain concrete pointing and chimney repairs
8. Maintain balcony and fences
9. Maintain cabinetry

Subject/Designation - CONSTRUCTION - SALES

Level - Occupational Training
Title - Building Materials Sales - Painting - Chart 3 CCDO# 8799

by Humber College 1973

TPOS
1. Selecting and applying the right paint for the job
2. Selecting the proper tools, abrasive and solvents
3. Surfaces preparation for painting
4. Estimating and purchasing paint
5. Paint application, undercoat and selection of finish coat
6. Wood treatment and preservatives, varnishes, stains, etc.
7. Ladders, trestles, scaffolds

Subject/Designation - CONSTRUCTION - SALES

Level - Occupational Training
Title - Building Materials Sales - Chart 4 - Carpentry CCDO# 8799

by Humber College 1973

TPOS
1. Lay flooring structure, flooring beams and sub floor
2. Erect all stud walls, plumb tie and fix
3. Construct roof
4. Install and fix windows and doors
5. Select and install insulation
6. Complete wall and ceiling covering
7. Cover in exterior walls
8. Install kitchen and bathroom cabinets and cut out for sinks
9. Complete interior trim
10. Complete exterior trim
11. Build front balcony
12. Erect fence

Subject/Designation - CONSTRUCTION

Level - Occupational Training
Title - Construction Technology CCDO# 1145-110

by Holland College 1970

TPOS
1. Communicate effectively
2. Identify, select and control application of construction materials
3. Interpret basic designs and apply sound construction principles
4. Select and maintain construction site tools and equipment
5. Produce, read and interpret drawings and specifications
6. Survey and investigate construction site surface and sub surface
7. Interpret and apply laws, codes, regulations and contract documents
8. Perform tests and inspections
9. Plan, coordinate,schedule and control projects
10. Take off quantities and estimate costs
11. Select, train and supervise personnel
12. Maintain efficient office and administrative procedures

Subject/Designation - CONSTRUCTION

Level - Occupational Training
Title - Drywall and Ceiling Erection and Finishing CCDO# 8784

by AVE, Nova Scotia 1973

TPOS
1. Layout according to floor plans
2. Use tools and equipment
3. Erect steel framing
4. Apply drywall
5. Install insulation
6. Tape and finish
7. Install suspended ceilings
8. Communicate and help coordinate with others on the job
9. Plan job
10. Install specialty units and materials

Subject/Designation - CONSTRUCTION

Level - Occupational Training
Title - Oil Burner Repair and Servicing CCDO# 8799

by Nova Scotia Newstart 1970

TPOS
1. Communicate effectively
2. Use and care for tools and equipment
3. Clean and service heating units
4. Service and overhaul nozzle assembly
5. Service and adjust fuel systems
6. Adjust and repair mechanical systems
7. Service and repair electrical systems and controls
8. Use measuring and testing devices

Subject/Designation - CONSTRUCTION - WIRE COMMUNICATIONS

Level - Occupational Training
Title - Cable Television Serviceman CCDO# 8735-170-00

by Humber College 1974

TPOS
1. Drive defensively (such as the Smith system)
2. Use hand tools and maintain
3. Repair and maintain subscriber equipment
4. Operate test equipment
5. Trouble shoot and isolate system, tv set and cable faults
6. Communicate and organize effectively

Note - developed by a DACUM committee

Subject/Designation - CONSTRUCTION - OTHER CONSTRUCTION TRADES

Level - Occupational Training
Title - Plumbing - Sheet Metal CCDO# 8791-114

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Personal and vocational adjustment
2. Safety and accident prevention
3. Water sources, water storage and pumps
4. Cold water system
5. Hot water system
6. Installing plumbing, fixtures and fittings
7. Drainage and disposal system
8. Sheet metal shop practices, tools and materials
9. Sheet metal pattern development and forming techniques
10. Sheet metal assembly and erection techniques
11. Plumbing and sheet metal welding
12. Print reading and sketching
13. Communication skills
14. Trade math and science
15. Science

Subject/Designation - CONSTRUCTION - OTHER CONSTRUCTION TRADES

Level - Occupational Training
Title - Gas Appliance Repair CCDO# 8791

by Job Corps 1969

TPOS
1. Use safety procedures
2. Use and maintain common hand tools
3. Use and maintain special equipment
4. Requisition parts
5. Estimate cost of repair
6. Repair connections and fittings
7. Maintain electrical components
8. Repair and maintain heating, cooling unit

Subject/Designation - CONSTRUCTION - OTHER CONSTRUCTION TRADES

Level - Occupational Training
Title - Trowel Trades CCDO# 8783

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Personal and vocational adjustment
2. Apply masonry procedures
3. Construct walls
4. Construct ornamental brickwork
5. Construct fireplaces, chimneys, flues
6. Construct pavements and steps
7. Build drainage system components
8. Plaster internal and external walls
9. Mix and cure concrete
10. Set out buildings
11. Erect scaffolds
12. Safety and accident prevention
13. Trade math and science
14. Sketching and blueprint reading
15. Communication skills

Subject/Designation - CONSTRUCTION - OTHER CONSTRUCTION TRADES

Level - Occupational Training
Title - Building Supervisor and Foreman In Service Training CCDO#

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Safety and accident prevention
2. Pre contract planning
3. Working knoledge of contract and legal obligations
4. Procuring, delivery and storage of materials
5. Site surveying and setting out
6. Keeping of site records
7. Project planning and progress monitoring
8. Industrial relations
9. Office, plant and equipment use and maintenance
10. Applied math
11. Drawing interpretation

Subject/Designation - CONSTRUCTION - OTHER CONSTRUCTION TRADES

Level - Occupational Training
Title - Cement Mason CCDO# 8783-122

by Job Corps 1969

TPOS
1. Use safety procedures on the job
2. Use care in handling tools
3. Use and maintain common tools
4. Use and maintain special tools

Subject/Designation - CONSTRUCTION - OTHER CONSTRUCTION TRADES

106

Title - Cement Mason (Continued from previous page)

TPOS (Continued)
5. Use and maintain measuring equipment
6. Use layout and design
7. Estimate job needs
8. Perform concrete masonry operations

Subject/Designation - CONSTRUCTION - OTHER CONSTRUCTION TRADES

Level - Occupational Training
Title - Custodial Maintenance CCDO# 8799-194

by Job Corps 1969

TPOS
1. Use safety procedures
2. Use common hand tools, special tools, and equipment
3. Plan work schedule
4. Take inventory of supplies and order if necessary
5. Deal with requests from tenants
6. Perform various cleaning operations
7. Repair piping systems and fixtures
8. Repair electrical circuits and fixtures
9. Maintain grounds
10. Perform painting operations
11. Maintain concrete and masonry
12. Perform building repairs
13. Perform miscellaneous maintenance duties

Subject/Designation - CONSTRUCTION - OTHER CONSTRUCTION TRADES

Level - Occupational Training
Title - Industrial Maintenance (Millwright) Mechanic CCDO# 8799-126

by Northern College 1974

TPOS
1. Communicate in the work environment
2. Perform job related math operations
3. Apply concepts of safe work habits
4. Select and use small hand tools
5. Operate machine shop tools and equipment
6. Read and interpret blueprints and schematics
7. Produce oxy acetylene and electric arc welds
8. Maintain and repair hydraulic and pneumatics systems
9. Install, maintain and repair mechanical equipment
10. Detect problems in electrical systems and take appropriate action

Subject/Designation - CONSTRUCTION - OTHER CONSTRUCTION TRADES 107

Level - Occupational Training
Title - Brick and Stone Mason CCDO# 8782

by Job Corps 1969

TPOS
1. Use safety procedures, re: scaffolds, tools, transporting of brick and mortar
2. Care and use of common hand tools, special tools, measuring equipment
3. Follow plans, directions, and boundaries for layout and design
4. Estimate bricks, blocks, mortar, scaffolding and man hours
5. Estimate total cost of building masonry structure
6. Mix mortar, sand, cement and water each properly and select aggregate of sand
7. Construct scaffold
8. Use trowel properly
9. Utilize knowledge of various bricklaying procedures
10. Utilize knowledge of corner and lead laying and joining

Subject/Designation - CONSTRUCTION _ OTHER CONSTRUCTION TRADES

Level - Occupational Training
Title - Carpenter - Construction CCDO# 8781-110

by Job Corps 1969

TPOS
1. Use safety procedures in shop and on the job
2. Use, maintain and operate tools and machinery
3. Use appropriate carpentry terminology
4. Interpret blueprints
5 Lay out building and excavating lines
6. Erect batton boards
7. Estimate costs
8. Construct foundation forms
9. Construct scaffolding forms
10. Construct frames and trusses
11. Install sheathing
12. Perform finishing work

CREATIVE ARTS

ANTIQUER

FINE ARTS

PERFORMING ARTS

COMMERCIAL ART

WRITING

Subject/Designation - ANTIQUER

Level - Occupational Training
Title - Antiquer CCDO# 8595-110-1

by Nova Scotia Newstart Inc. 1970

TPOS
1. Use hand tools
2. Use mechanical and power tools
3. Prepare and finish wood and metals
4. Turn and spin
5. Carve form and sculpture
6. Construct wood joints
7. Fasten and join wood
8. Management of operation
9. Perform general shop duties

Subject/Designation - FINE ART

Level - Occupational Training
Title - Leather Handcraft CCDO# 3319

by Nova Scotia Dept. of Education

TPOS
1. Select and use tools and materials
2. Layout and cut leather
3. Assemble punch and lace leather
4. Decorate and finish leather
5. Install findings
6. Design handcraft articles
7. Manage craft operation

Subject/Designation - FINE ART

Level - Occupational Training
Title - Jewelry Handcraft CCDO# 3319

by Nova Scotia Dept. of Education 1970

TPOS
1. Select and use tools and equipment
2. Produce flat work
3. Produce wire work
4. Anneal and join silver
5. Texture, etch colour and polish silver
6. Enamel jewelry
7. Set and cut stones
8. Produce wrought iron work
9. Design handcraft articles
10. Manage craft operation

Subject/Designation - FINE ART

Level - Occupational Training
Title - Pottery Handcraft CCDO# 3319

by Nova Scotia Dept. of Education 1970

TPOS
1. Prepare materials
2. Hand build pottery
3. Make wheel thrown pots
4. Decorate pottery
5. Fire pottery
6. Glaze pottery
7. Make glazes
8 Maintain, store and use tools and equipment
9. Make molds
10. Cast pottery
11. Design pottery articles
12. Manage craft operation

Subject/Designation - FINE ART

Level - Occupational Training
Title - Machine Knitting Handcraft CCDO# 3319

by Nova Scotia Dept. of Education 1970

TPOS
1. Machine knit
2. Finish garment

Subject/Designation - FINE ART

Level - Occupational Training
Title - Sewing and Weaving Handcraft CCDO# 3319

by Nova Scotia Dept. of Education 1970

TPOS
1. Layout and cut for sewing
2. Sew
3. Construct garments
4. Construct sewn articles
5. Design handcraft articles
6. Manage craft operation
7. Interpret weave patterns, drafts
8. Make warps
9. Dress looms
10. Weave on looms

Subject/Designation - FINE ART

Level - Occupational Training
Title - Wood Handcraft CCDO# 3319

by Nova Scotia Dept. of Education 1970

TPOS
1. Use hand tools
2. Use mechanical and power tools
3. Prepare and finish wood
4. Turn and spin
5. Carve, form and sculpture
6. Construct wood joints
7. Fasten and join wood
8. Upholster furniture
9. Design handcraft articles
10. Manage craft operation

Subject/Designation - FINE ART

Level - Occupational Training
Title - Florist Assistant CCDO# 3319

by Job Corps 1969

TPOS
1. Use safety precautions when handling plants with thorns and when handling insecticides.
2. Identify types of flowers
3. Take orders and arrange for delivery
4. Suggest flower arrangements to customer
5. Take inventory and plan for demands
6. Grow and nurture plants
7. Cut, preserve and treat plants
8. Arrange plants from previous plans and or directions
9. Store under correct conditions
10. Create original arrangements

Subject/Designation - PERFORMING ARTS

Level - Occupational Training
Title - Broadcasting and Film Arts CCDO# 3330-118

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Personal and vocational adjustment
2. Safety and accident prevention
3. Communication media, law and ethics
4. Communications equipment
5. Announcing and presentation technique
6. Prepare and produce radio broadcasts
7. Prepare and produce tv broadcasts
8. Prepare and produce educational programs

(continued on next page)

Subject/Designation - PERFORMING ARTS

Title - Broadcasting and Film Arts (Continued from previous page)

TPOS (Continued)
9. Prepare and produce stills and motion pictures
10. Social studies
11. Understand station management
12. Communication skills

Subject/Designation - PERFORMING ARTS

Level - Occupational Training
Title - Radio Announcing CCDO# 3337

by AVE, Nova Scotia 1973

TPOS
1. Communicate on the air
2. Communicate with others
3. Read well, pronounce and enunciate
4. Project appropriate on the air personality
5. Operate independently
6. Handle routines
7. Operate equipment
8. Create programming
9. Handle news work
10. Produce commercials
11. Deal effectively with the public
12. Keep well informed

Subject/Designation - COMMERCIAL ART

Level - Occupational Training
Title - Commercial Design CCDO# 3313

by Holland College 1970

TPOS
1. Manage art operation
2. Letter and use typography
3. Produce graphics
4. Draw, shade and render
5. Colour and paint
6. Use photography
7. Apply texture and materials
8. Create functional designs
9. Compose
10. Design for a coordinate production
11. Analyze and define design problems

Subject/Designation - COMMERCIAL ART

Level - Occupational Training
Title - Photography CCDO# 3315-110

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Personal and vocational adjustment
2. Safety and accident prevention
3. Use of equipment
4. Indoor photography
5. Outdoor photography
6. Negative materials and processing
7. Positive materials and printing
8. Colour photography
9. Theoretical and applied studies
10. After processing techniques
11. Art and design
12. Organization and management
13. Applied math and science
14. Communication skills

Subject/Designation - COMMERCIAL ART

Level - Occupational Training
Title - Commercial and/or Graphic Artist CCDO# 3313

by Job Corps 1969

TPOS
1. Use safety procedures
2. Use and care for materials and equipment
3. Perform linear design and patterns
4. Use colour, shading, texture, perspective and anatomy principles properly
5. Use knowledge of media to create designs using a variety of methods
6. Use freehand lettering and layout lettering and mechanical lettering equipment
7. Make drawings of various subject matter
8. Use illustration techniques
9. Use various layout methods
10. Make technical illustrations
11. Prepare visual communication
12. Use various reproduction methods and processes
13. Organize work properly
14. Requisition supplies and equipment when necessary

Subject/Designation - WRITING

Level - Occupational Training
Title - Practical Journalism CCDO#3351-166

by Holland College 1972

TPOS
1. Develop professional competence
2. Gather information

(continued on next page)

Subject/Designation - WRITING

Title - Practical Journalism (Continued from previous page)

TPOS (continued)

3. Conduct interview
4. Prepare written materials
5. Select, assemble, edit and present information
6. Initiate and develop feature stories
7. Select, operate and care for equipment
8. Select, train and supervise staff
9. Manage communication operations

EDUCATION AND TRAINING

Subject/Designation - EDUCATION AND TRAINING

Level - Adult
Title - Designing a Curriculum (DACUM) CCDO#_____

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Developing and validating curriculum
2. Selecting text and reference materials
3. Related activities

Subject/Designation - EDUCATION AND TRAINING

Level - Occupational Training
Title - Instructional Methods CCDO# 2797

by Holland College 1972

TPOS
1. Identify, select and operate training aids
2. Prepare and organize materials for programs
3. Assess and utilize community resources
4. Conduct training sessions
5. Establish and maintain learning environment
6. Assess and respond to trainee needs
7. Plan, manage and organize training program
8. Evaluate training program
9. Display personal skills relating to role

Subject/Designation - EDUCATION AND TRAINING

Level - Occupational Training CCDO# 2791
Title - Communication Skills - Commercial Teacher Training Program

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Comprehension
2. Group communication
3. Written expression

Subject/Designation - EDUCATION AND TRAINING

Level - Post Secondary
Title - Instructors of Individualized Programs CCDO# 2791-000

by Humber College 1974

TPOS
1. Develop and revise instructional systems
2. Communicate effectively
3. Manage the learning situation
4. Manage the support system
5. Develop independent learners 6. Affect positively the learners self concept

Subject/Designation - EDUCATION AND TRAINING

//7

Level - Occupational Training
Title - Learner Assistance Monitoring CCDO#_____

by Nova Scotia Newstart 1970

TPOS
1. Assist in design of programs for individual trainee
2. Personally evaluate trainee progress
3. Maintain effective learning environment
4. Assits trainee in self learning
5. Develop learning materials
6. Interact effectively within the training centre
7. Communicate effectively with trainee
8. Interact effectively with the community
9. Develop personal competence

Subject/Designation - EDUCATION AND TRAINING

Level - Occupational Training
Title - Professional Counselling (School) CCDO# 2391-118

by AVE, Nova Scotia 1971

TPOS
1. Communicate
2. Identify and specify problems and student needs
3. Apply counselling methods
4. Apply special group counselling methods
5. Measure and evaluate
6. Serve as consultant
7. Apply behaviour change techniques
8. Administer program of services
9. Organize and conduct vocational and educational information programs
10. Enlist and utilize community referral services
11. Employ effective instructional techniques
12. Develop and implement program in psychological education
13. Continue to acquire professional competence

Subject Designation - EDUCATION AND TRAINING

Level - Occupational Training
Title - Skill Program Development Planning and Implementation CCDO#_____

by AVE, Nova Scotia

TPOS
1. Detect and explore training needs
2. Develop DACUM charts
3. Select instructors
4. Orient instructors
5. Develop learning activities
6. Select activity resources
7. Organize and prepare labs
8. Select trainees
9. Manage trainee activities

Subject/Designation - EDUCATION AND TRAINING

Level - Occupational Training
Title - Audio Visual Communications Support for the Learning Environment

by Nova Scotia Newstart 1970 CCDO#_____

TPOS
1. Prepare audio recordings
2. Prepare video recordings
3. Prepare graphics
4. Prepare permanent visual materials
5. Produce av productions
6. Present av productions
7. Set up and maintain av equipment and software
8. Manage av facility
9. Communicate effectively

Subject/Designation - EDUCATION AND TRAINING

Level - Occupational Training
Title - Instructional Materials Centre Technician CCDO# 2719-110

by Humber College 1972

TPOS
1. Plan and produce still photographic materials
2. Identify and set up and operate non tape components
3. Operate equipment, plan and produce tape recorded materials
4. Present slide and filmstrip projected materials
5. Plan, produce and present overhead projectuals
6. Plan, produce and present a single camera tv production
7. Set up and operate motion picture projection equipment
8. Plan and produce sign materials
9. Plan and produce duplicating materials
10. Plan, produce and present a short motion picture film
11. Plan, produce and operate a programmed slide presentation

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Subject/Designation - EDUCATION AND TRAINING

Level - Occupational Training
Title - Learning Evaluation and Activity Development CCDO#_____

by Holland College 1971

TPOS
1. Assist in the design of individual learners program
2. Evaluate learner progress
3. Create and maintain learning environment
4. Assist learners in occupational skill development

(continued on next page)

Subject/Designation - EDUCATION AND TRAINING

Title - Learning Evaluation and Activity Development (Continued from previous page)

TPOS (continued)

5. Assist in self learning
6. Develop learning materials
7. Communicate with learners
8. Communicate with staff in training environment
9. Interact with the community
10. Develop personal competencies
11. Perform administrative or related functions

ENGINEERING TECHNOLOGY

SURVEYOR

DRAFTSMAN

Subject/Designation - ENGINEERING TECHNOLOGY

Level - Post Secondary
Title - Precision Instrument Technician CCDO# 8588-118

by Humber College 1973

TPOS
1. Operate and maintain machine tools
2. Select, use and maintain hand tools
3. Use measuring equipment, mechanical, optical, electrical
4. Design assembly and testing devices
5. Assemble instruments - mechanical, optical, electrical
6. Repair, adjust and maintain instruments
7. Read and interpret blueprints and schematics
8. Identify and select materials and components
9. Communicate effectively

note - produced by DACUM committee

Subject/Designation - ENGINEERING TECHNOLOGY

Level - Post Secondary
Title - Electrical Technology CCDO# 2165

by Nova Scotia Dept. of Education 1971

TPOS
1. Identify and select components
2. Calculate electrical math problems
3. Analyze electrical circuitry
4. Design electrical circuitry and equipment, facilities
5. Use hand tools and associated equipment
6. Use test and measuring equipment
7. Repair and maintain rotary equipment
8. Maintain and install control equipment
9. Maintain and repair high voltage switchgear, transformers
10. Install equipment
11. Supervise work
12. Communicate effectively

Subject/Designation - ENGINEERING TECHNOLOGY

Level - Post Secondary
Title - Electronics Technology CCDO# 2165

by Holland College 1970

TPOS
1. Identify, select and handle electronic components
2. Apply tools and testing equipment

(continued on next page)

Subject/Designation _ ENGINEERING TECHNOLOGY

Title - Electronics Technology (continued from previous page)

TPOS(Continued)
3. Analyze electronic circuits and systems
4. Test, maintain and calibrate electronic equipment
5. Trouble shoot, isolate and repair defective units
6. Install, interface and design systems
7. Construct model and prototype electronic equipment
8. Design and develop electronic circuits and equipment
9. Perform electronics math calculations
10. Plan and control work methods
11. Interpret and communicate technical information

Subject/Designation - ENGINEERING TECHNOLOGY

Level - Post Secondary
Title - Industrial Instrumentation Technician CCDO# 2165

by Humber College 1973

TPOS
1. Design a simple instrument system
2. Maintain instruments by calibration and/or repair
3. Trouble shoot instruments and control systems
4. Install instrument systems
5. Calculate math computation related to process
6. Use hand tool and mechanical measuring devices
7. Use test equipment
8. Communicate effectively at all levels
9. Supervise work

note - produced by a DACUM committee

Subject/Designation - ENGINEERING TECHNOLOGY

Level - Post Secondary
Title - Plastics Production Technology CCDO# 2165

by Holland College 1972

TPOS
1. Identify, select and handle materials
2. Operate, adjust and maintain equipment
3. Form and fabricate plastic materials
4. Apply machine production methods
5. Test and inspect materials and parts
6. Design and produce tooling
7. Plan and control method of operation
8. Establish cost and market procedures
9. Determine time and labour requirements
10. Interpert and apply safety and governmental regulations
11. Interpret and communicate technical information

Subject/Designation - SURVEYING

Level - Occupational Training
Title - Property Mapping CCDO# 2161

by Nova Scotia Dept. of Education 1974

TPOS
1. Perform general drafting techniques
2. Interpret and use air photos
3. Interpret maps
4. Locate and interpret documents
5. Interpret survey work
6. Communicate effectively in the work environment
7. Perform field work
8. Prepare maps
9. Operate office equipment
10. Organize and administer work
11. Index and file

Subject/Designation - DRAFTING

Level - Occupational Training
Title - Draftsman CCDO#2163-110

by Job Corps 1969

TPOS
1. Use safety procedures
2. Use and maintain tools and instruments
3. Use line symbols and conventional representation
4. Perform tracing operations
5. Apply principles of geometric projections
6. Apply principles of isometric drawings
7. Use machine drawings
8. Use structural drawings
9. Use architectural drawings
10. Use civil engineering drawings
11. Use sheet metal drawings
12. Operate print machinery

FARMING AND ANIMAL HUSBANDRY

Subject/Designation - FARMING AND ANIMAL HUSBANDRY

Level - Occupational Training
Title - Farm Business Management Counselling CCDO# 7131-110

by Holland College

TPOS
1. Communicate, counsel and interview
2. Plan, implement and evaluate farm management training and extension programs
3. Assist in establishing, maintaining and utilizing farm records
4. Obtain and manage physical resources
5. Advise on financial management
6. Develop and evaluate alternative farm business plans
7. Advise on management implications on laws and legislation affecting farmers
8. Advise on marketing strategy
9. Advise on estate planning and business arrangements
10. Inform and advise on concepts of personnel management
11. Inform and advise on business concepts and processes

Subject/Designation - FARMING AND ANIMAL HUSBANDRY

Level - Occupational Training
Title - Farm Business Management CCDO# 7131-110

by Holland College 1972

TPOS
1. Hire, train and supervise personnel
2. Manage financial resources
3. Manage physical resources
4. Prepare,maintain and analyze farm records
5. Analyze and evaluate farm methods and practices
6. Manage purchasing operations
7. Market effectively
8. Interpret and apply legislation and regulations
9. Communicate effectively

Subject/Designation - FARMING AND ANIMAL HUSBANDRY

Level - Occupational Training
Title - Animal Husbandry CCDO# 7113-126

by Holland College 1972

TPOS
1. Plan and use land resources
2. Plan and maintain buildings
3. Operate and maintain equipment
4. Select and breed livestock
5. Feed livestock
6. Maintain animal health
7. Market livestock and products
8. Manage livestock operation
9. Communicate effectively

Subject/Designation - FARMING AND ANIMAL HUSBANDRY

Level - Occupational Training
Title - Cereal and Forage Crops Production CCDO# 7115-122

by Holland College 1972

TPOS
1. Assess fertility requirements of crops
2. Prepare cropping program
3. Prepare land and plant crops
4. Operate and maintain farm machinery
5. Manage crops
6. Harvest crops
7. Store crops
8. Manage farm operation
9. Utilize and market crops
10. Communicate effectively

Subject/Designation - FARMING AND ANIMAL HUSBANDRY

Level - Occupational Training
Title - Field Vegetables and Tobacco Production CCDO# 7115-114

by Holland College 1972

TPOS
1. Select types of land, fertilizer and variety of seeds for optimum production
2. Prepare land seed and plant crops
3. Prepare crops for market
4. Direct crop care and pest control practices
5. Harvest, handle and store crops
6. Operate and maintain machinery and equipment
7. Plan, maintain and utilize buildings
8. Analyze, develop and implement marketing programs
9. Manage farm operation

Subject/Designation - FARMING AND ANIMAL HUSBANDRY

Level - Occupational Training
Title - Farrier Training CCDO# 7187-118

by Dept. of Ed., B.C.

TPOS
1. Describe anatomy and function of feet and legs
2 Define and confirmation of the horse
3. Handle the horse
4. Use tools and materials
5. Carry out forge work
6. Care for the foot
7. Apply shoes hot and cold
8. Shoe different types and breeds
9. Run a business
10. Attend clinics

FISHING

Subject/Designation - FISHING

Level - Occupational Training
Title - Deckhand Training CCDO# 7313-122

by Nova Scotia Newstart 1970

TPOS
1. Perform emergency duties
2. Perform general ship duties
3. Maintain efficient work environment
4. Steer a vessel
5. Rig fishing gear
6. Maintain fishing gear
7. Operate trawl fishing gear
8. Fish by long line
9. Operate purse seine fishing gear
10. Handle and process fish
11. Lead a constructive working life

FORESTRY & LOGGING

Subject/Designation - FORESTRY AND LOGGING

Level - Occupational Training
Title - Softwood Lumber Grading CCDO# 7516

by Northern College 1973

TPOS
1. Communicate in the work environment
2. Maintain the dressed size of lumber
3. Maintain the manufacturing standard
4. Measure and evaluate the degrading characteristics
5. Grade light framing structural joists and planks, boards, structural light framing and studs
6. Locate and follow the rules and regulations on decking, beams, and stringers, and post, timbers
7. Grade stamp dressed lumber
8. Separate and identify the commercial softwood lumber species of northern Ontario
9. Maintain equipment and materials

Subject/Designation - FORESTRY AND LOGGING

Level - Occupational Training
Title - Forestry Filers CCDO# 7513

by Northern College 1972

TPOS
1. Work environment
2. Practice safety and maintain tools and equipment
3. Use tools and equipment
4. Perform math operations
5. Sharpen band and circular saws
6. Tension band and circular saws
7. Shape and swage band saws
8. Repair band and circular saws
9. Repair carbide saws
10. Sharpen knives
11. Align band mills, tracks, resaws, edgers, gang saws, trimmers
12. Maintain hydraulic systems
13. Operate machine shop equipment

Subject/Designation - FORESTRY AND LOGGING

Level - Occupational Training
Title - Forest Products Scaling CCDO# 7516

by Northern College 1973

TPOS
1. Scale and determine volume of cubed wood
2. Scale and determine volume of stacked wood
3. Scale and determine volume of saw logs
4. Butt scale tree length

 (continued on next page)

Subject/Designation - FORESTRY AND LOGGING

Title - Forest Products Scaling (Continued from previous page)

TPOS (Continued)
5. Weight scale bulk volume of wood
6. Separate and identify all commercial hardwood species
7. Separate and identify all commercial softwood species
8. Use tools and equipment

Subject/Designation - FORESTRY AND LOGGING

Level - Occupational Training
Title - Primary Forest Harvesting CCDO# 7511-110

by AVE, Nova Scotia 1973

TPOS
1. Communicate
2. Care for and use tools and equipment
3. Maintain chain saw motors
4. Diagnose and make minor repqirs to chain saws
5. Maintain chain saw cutting assembly
6. Utilize wood fibre
7. Plan and layout cutting operations
8. Render first aid and minimize injuries
9. Harvest wood fibre
10. Suppress fire

Subject/Designation - FORESTRY AND LOGGING

Level - Occupational Training
Title - Cutter/Skidder Operator CCDO# 7513-118

by Confederation College 1975

TPOS
1. Maintain safe working environment
2. File and maintain chain saw
3. Fell, limb and top trees
4. Organize load
5. Prepare and maintain skidway
6. Use correct choking procedures
7. Operate and maintain skidding equipment
8. Skid and pile delimbed trees
9. Work as a team member

MANAGEMENT AND ADMINISTRATION

Subject/Designation - MANAGEMENT AND ADMINISTRATION

Level - Occupational Training
Title - Local Government and Band Management for Community Development

by Dept. of Ed., B.C. 1974 CCDO# 1119

TPOS
1. Participate effectively in the community
2. Apply procedures for land claims settlement
3. Supervise land administration and management of band assets
4. Apply legislative functions
5. Apply management and supervisory techniques
6. Communicate effectively
7. Plan, organize and supervise economic development
8. Plan and regulate the administering of financial management
9. Plan and supervise the administering of community development programs
10. Perform public relations functions
11. Provide and administer information services
12. Perform financial management functions
13. Apply land administration procedures
14. Perform office administration procedures
15. Administer economic development programs
16. Administer social, community development and service programs
17. Administer educational and training programs

note - these functions refer to an Indian Band and their council

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Subject/Designation - MANAGEMENT AND ADMINISTRATION

Level - Occupational Training
Title - Principles and Practices of Modern Business CCDO# 1179-299

by Holland College 1973

TPOS
1. Communicate effectively and develop personal competence
2. Manage and develop employees
3. Organize for effective work environment
4. Participate in general office procedures
5. Operate accounting systems
6. Manage financial resources
7. Manage physical resources
8. Operate sales and promotion
9. Participate in marketing operations
10. Manage purchasing operations

Subject/Designation - MANAGEMENT AND ADMINISTRATION

Level - Post Secondary
Title - Business Management CCDO# 1179

by Holland College 1970

TPOS
1. Communicate effectively and develop personal competence
2. Manage and develop personnel
3. Organize for effective work environment
4. Participate in general office procedures
5. Operate accounting system
6. Manage financial resources
7. Manage physical resources
8. Gather data and develop reports
9. Operate sales and promotion
10. Participate in marketing operations
11. Manage purchasing operations

Subject/Designation - MANAGEMENT AND ADMINISTRATION

Level - Post Secondary
Title - Executive and Administrative Assistant CCDO# 1179

by Holland College 1970

TPOS
1. Communicate effectively and develop personal competence
2. Assist in managing executives' work
3. Supervise and develop staff
4 Organize and maintain office equipment
5. Organize and maintain correspondence and files
6. Perform basic bookkeeping functions
7. Operate business machines
8. Type and transcribe
9. Organize and prepare written communication
10. Coordinate research and development of executive presentations

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MATERIAL HANDLING

Subject/Designation - MATERIAL HANDLING

Level - Occupational Training
Title - Binding and Warehouse CCDO# 4155

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Personal and vocational adjustment
2. Safety and accident prevention
3. Warehouse (paper storage)
4. Warehouse operations
5. Binding materials and tools
6. Finishing and design
7. Letterpress binding
8. Stationery binding
9. Miscellaneous binding
10. Trade, math and science
11. Communication skills

Subject/Designation - MATERIAL HANDLING

Level - Occupational Training
Title - General Warehousing Stockroom Work CCDO# 9319

by AVE, Nova Scotia 1973

TPOS
1. Communicate effectively
2. Receive merchandise
3. Maintain stock control of inventory
4. Perform merchandise pricing functions
5. Store merchandise
6. Receive and process returned merchandise
7. Process orders and ship merchandise
8. Supervise warehouse activities
9. Operate and maintain warehouse equipment
10. Follow safety, security and fire regulations

Subject/Designation - MATERIAL HANDLING

Level - Occupational Training
Title - Warehouseman and Materials Handler CCDO# 4155

by Job Corps 1969

TPOS
1. Use safety procedures
2. Inspect forklifts, etc. for wear
3. Use and maintain common hand tools
4. Use and maintain special equipment
5. Perform receiving operations
6. Identify and store materials
7. Distribute and package materials properly

MEDICINE AND HEALTH

Subject/Designation - MEDICINE AND HEALTH

Level - Occupational Training
Title - Mental Health Care CCDO# 3139-199

by Humber College/National Insti. for Retard. 1975

TPOS
1. Apply change agentry principles in developing adaptive human service forms
2. Apply planning concepts and quality control measures
3. Evaluate a wide range of human service programs
4. Integrate the techniques of change agentry, planning and evaluation in order to analyze or develop a major plan or proposal
5. Possess the ability to train others

Subject/Designation - MEDICINE AND HEALTH

Level - Occupational Training
Title - Dental Assisting CCDO# 3157-138

by Holland College 1974

TPOS
1. Communicate effectively and develop personal competence
2. Perform receptionist duties
3. Perform extra oral clinical procedures
4. Perform intra oral clinical procedures
5. Identify instruments and materials for tray set ups
6. Prepare and manipulate dental materials
7. Maintain and care for equipment
8. Participate in lab procedures
9. Perform x ray procedures

Subject/Designation - MEDICINE AND HEALTH

Level - Occupational Training
Title - Physiotherapist Science Course CCDO# 3137-122

by Technical Services Branch, Lusaka, Zambia

TPOS
1. Chemistry
2. Physics
3. Introduction to human biology
4. Communication skills

Subject/Designation - MEDICINE AND HEALTH

Level - Adult
Title - Hospital Orderly CCDO# 3135-114

by Confederation College 1975

TPOS
1. Provide patient care as required
2. Assist in maintenance of patient hygiene
3. Perform hospital routines as required
4. Assist the patient in elimination functions
5. Maintain professional attitude.

Subject/Designation -MEDICINE AND HEALTH

Level - Adult
Title - Practical Nursing CCDO# 3131-130

by Dept. of Ed.,B.C.

TPOS
1. Apply elements of health care
2. Assist in meeting needs for nutrition
3. Assist in meeting needs for elimination
4. Assist in meeting needs for protection
5. Assist in meeting needs for respiration
6. Assist in meeting needs for mobility
7. Assist in meeting needs for sensory satisfaction
8. Assist in meeting needs for self esteem, love, affection
9. Develop personal and vocational skills
10. Work effectively with others

Subject/Designation - MEDICINE AND HEALTH

Level - Occupational Training
Title - Pharmacy Assistant CCDO# 3151

by Dept. of Ed., B.C. 1973

TPOS
1. Develop personal and vocational skills
2. Assist in preparing prescriptions
3. Maintain inventory
4. Keep records
5. Develop typing skills
6. Apply customer relations procedures and techniques
7. Communicate effectively
8. Apply good housekeeping procedures

Subject/Designation - MEDICINE AND HEALTH

Level - Occupational Training
Title - Nursing Assistant CCDO# 3134

by Northern College 1973

TPOS
1. Communicate effectively and follow direction of R.N.in organizing procedures
2. Care for and handle equipment and supplies
3. Maintain a safe and therapeutic environment
4. Observe and report accurately
5. Meet physical needs of patient
6. Meet emotional needs of patient
7. Develop personal and vocational competence
8. Apply special nursing skills

Note - this program is related to RNA training

Subject/Designation - MEDICINE AND HEALTH

Level - Occupational Training
Title - Occupational Profile - Health Care Aide CCDO# 3135

by Northern College 1973

TPOS
1. Communicate effectively and promote activation
2. Develop required personal and occupational qualities
3. Care for and properly handle equipment and supplies
4. Maintain a safe and therapeutic environment
5. Meet physical needs of resident
6. Meet emotional needs of resident
7. Apply special nursing skills
8. Observe, report and record accurately

Subject/Designation - MEDICINE AND HEALTH

Level - Occupational Training
Title - Child Mental Health Service CCDO# 3139

by Atlantic Child Guidance Centre, Nova Scotia 1974

TPOS
1. Advocate for children
2. Apply activity group techniques
3. Apply verbal group techniques
4. Do activity therapy
5. Do basic therapy
6. Intervene in crisis problems
7. Work in team setting
8. Communicate with other professionals
9. Teach
10. Diagnose and choose treatment
11. Administer

Subject/Designation - MEDICINE AND HEALTH

Level - Occupational Training
Title - Health Care Aide CCDO#3139-199

by Algonquin College 1975

TPOS
1. Care of self and others
2. Maintain safe environment and deal with emergencies
3. Prepare and serve nutritious and economical family meals
4. Promote good health habits and care for sick under supervision
5. Promote good health habits and care for sick under supervision
6. Follow specified program of care for handicapped person, give support help to client or family
7. Care for home and furnishings in acceptable manner

Subject/Designation - MEDICINE AND HEALTH

Level - Post Secondary
Title - General Nursing Practice CCDO# 3133

by Yarmouth Regional Hosp. School of Nursing 1970

TPOS
1. Communicate effectively and organize nursing
2. Care for, use equipment, instruments and supplies
3. Meet safety needs
4. Meet physical needs
5. Carry out emergency procedures
6. Administer medication
7. Recognize symptoms and conditions
8. Initiate rehabilitative measures
9. Practice preventive measures
10. Administer specific nursing care
11. Develop personal competence
12. Meet psychological needs

METAL MACHINING

Subject/Designation - METAL MACHINING

Level - Occupational Training
Title - Machine Shop CCDO# 8315-122

by Algonquin College 1974

TPOS
1. Work safely
2. Communicate effectively
3. Identify and use hand tools
4. Use measuring instruments
5. Solve, calculate basic shop math problems
6. Read and interpret blueprints - move cards, layouts
7. Identify and verify, analyze materials
8. Use cutting tools and metal removal methods
9. Use cutting tools and metal removal methods
10. Produce a drilled item to a locational tolerance of $\pm$ .005 on a drill press
11. Produce lathe finished item to a concentricity and tolerance of $\pm$ .002
12. Produce finished item from milling machine to tolerance of $\pm$ .002 @ 15 minutes
13. Produce machine finished items to a tolerance of $\pm$ .0005 by grinding
14. Program and produce simple piece part point to point (M/C)

Subject/Designation - METAL MACHINING

Level - Occupational Training
Title - Machinist (Engineering) CCDO# 8315-122

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Personal and vocational adjustment
2. Safety and accident prevention
3. Measurement
4. Marking off
5. Benchwork and fitting
6. Properties of ferrous, non ferrous metals and metals
7. Forging and heat treatment
8. Power saws
9. Drilling Machines
10. Lathes
11. Shapers
12. Milling machines
13. Grinding
14. Sketching, drawing, and blueprint reading
15. Trade math and science
16. Communication skills

Subject/Designation - METAL MACHINING

Level - Occupational Training
Title - Automatic Screw Machine Setter/Operator - Single Spindle CCDO# 8313-282

by Humber College 1974

TPOS
1. To make measurement of screw machine parts
2. To make a simulation set up
3. To make set up #1
4. To make set up #2
5. To make set up #3
6. To make set up #4
7. To make set up #5
8. To make set up #6
9. To make set up #7
10. To make set up #8
11. To make set up #9
12. To make set up #10

Note - simulations and set ups call for several tasks and the production of a specific job to standards

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Subject/Designation - METAL MACHINING

Level - Occupational Training
Title - Automatic Screw Machine Setter/Operator - Multi Spindle CCDO# 8315-138

by Humber College 1974

TPOS
1. To take measurements of screw machine parts
2. To understand and describe machine principles, mechanisms and motions
3. To make a turret lathe set up
4. To make a simulation set up
5. To set up machine to specimen #1 layout
6. To set up machine to specimen #2 layout
7. To set up machine to specimen #3 layout
8. To set up machine to specimen #4 layout
9. To set up machine to specimen #5 layout
10. To make a davenport simulation set up
11. To set up machine to specimen #6 layout
12. To set up machine to specimen #7 layout

Subject/Designation - METAL MACHINING

Level - Occupational Training
Title - Machine Operator/Machine Set Up Man CCDO# 8313

by Job Corps 1969

TPOS
1. Use safety procedures
2. Use and maintain common hand tools
3. Use and maintain special tools and equipment

 (continued on next page)

Subject/Designation - METAL MACHINING

Title - Machine Operator/Machine Set Up Man (Continued from previous page)

TPOS (Continued)

4. Fill out purchase orders, route slips
5. Perform clean, maintenance tasks
6. Perform machine set up operations
7. Operate various machines - lathe, milling, shaper, drill press, contour machine and grinding machine

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METAL SHAPING AND FORMING

AIRCRAFT FABRICATING AND FORMING

Subject/Designation - METAL SHAPING AND FORMING

Level - Occupational Training
Title - Metal Fabrication (Heavy) CCDO# 8330

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Personal and vocational adjustment
2. Communication skills
3. Sketching and blueprint reading
4. Trade math and science
5. Materials
6. Workshop materials
7. Marking development and template making - thick plate
8. Marking and template - making structural sections
9. Cutting and forming
10. Thermal jointing and cutting
11. Assembly, fastening and testing
12. Safety

Subject/Designation - METAL SHAPING AND FORMING

Level - Occupational Training
Title - Welding CCDO# 8335-126

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Personal and vocational adjustment
2. Safety and accident prevention
3. Arc welding of metals
4. Oxy acetylene welding of materials
5. Gas and arc cutting
6. Joint design and distortion control
7. Knowledge of materials and basic metallurgy
8. Forging and heat treatment
9. Benchwork and measuring
10. Trade math and science
11. Sketching and blueprint reading
12. Communication skills

Subject/Designation - METAL SHAPING AND FORMING

Level - Occupational Training
Title - Welder CCDO# 8335-126

by Job Corps 1969

TPOS
1. Use safety procedures
2. Use first aid procedures for burns
3. Use blueprints
4. Apply theory of welding

(continued on next page)

Subject/Designation - METAL SHAPING AND FORMING

Title - Welder (Continued from previous page)

TPOS (Continued)
5. Test Welds
6. Identify metals
7. Perform oxy acetylene welding and cutting operations
8. Perform arc welding operations
9. Perform tungsten inert gas welding operations
10. Perform metal inert gas welding operations

Subject/Designation - METAL SHAPING AND FORMING

Level - Occupational Training
Title - Welder Fitter CCDO# 8335-114

by Humber College 1973

TPOS
1. To run multiple weld beads in flat position
2. To identify and select joints, electrodes and symbols
3. To run downhand, horizontal and vertical welds, arc cutting
4. To run welds in the vertical up and overhead positions
5. To run oxy acetylene welds beads in the downhand position
6. To run oxy acetylene corner,edge fillet and butt joints
7. To cut straight lines, bevels, and pierce holes with oxy acetylene cutting torch
8. To run braze weld joints by oxy acetylene process
9. To run tungsten inert gas weld beads in the downhand position
10. To run tungsten inert gas corner, lap, fillet and butt welds
11. To run metal inert gas weld beads in the downhand position
12. To run metal inert gas lap, fillet and butt welds in steel and aluminum

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Subject/Designation - METAL SHAPING AND FORMING

Level - Occupational Training
Title - Welding Fabrication CCDO# 8335

by Nova Scotia Newstart 1971

TPOS
1. Communicate effectively
2. Maintain safe and efficient work environment
3. Use shop tools and equipment
4. Identify metal to be welded and select filler and shielded material
5. Weld
6. Maintain and set up equipment
7. Prepare and assemble materials
8. Operate different types of welding machines
9. Determine quality of finished work.

Subject/Designation - METAL SHAPING AND FORMING

Level - Occupational Training
Title - Brake Shear and Press set up Operator CCDO# 8334-114

by Humber College 1973

TPOS
1. Identify the pressworking industry and machinery
2. Use hand tools and measuring equipment
3. Use sheet materials of various types and specifications
4. Calculate, area, percent, fractions, decimals, angle geometry
5. Read blueprints, and layout on sheet metal
6. Operate the power shear
7. Plan, sequence and set up on power shear
8. Insert dies (preselected) and operate press brake
9. Select dies and set stops and guides on press brake
10. Perform punching, forming and notching operations
11. Perform successive operations from one machine set
12. Perform basic set up operations on a punch press

related to manufactured metal products

Subject/Designation - METAL SHAPING AND FORMING

Level - Occupational Training
Title - Sheet Metal Worker CCDO# 8333

by Job Corps 1969

TPOS
1. Use safety procedures
2. Use and maintain common hand tools, special tools, measuring and marking equipment
3. Estimate time and cost of work
4. Select gauge materials for job
5. Apply mathematical principles
6. Perform layout and design operations
7. Perform cutting, bending and forming operations on metal
8. Fasten sheet metal components
9. Construct common sheet metal components
10. Construct offsets
11. Repair damaged sheet metal

Subject/Designation - METAL SHAPING AND FORMING - AIRCRAFT FABRICATING

Level - Occupational Training
Title - Airframe Subassembling CCDO# 8510-110

by AVE, Nova Scotia 1974

TPOS
1. Perform general shop procedures
2. Interpret work orders
3. Interpret and use blueprints and instructions
4. Select, use and care for hand tools
5. Layout work, make and use templates
6. Measure using precision measuring equipment
7. Identify and work materials according to their propert es
8. Operate basic floor mounted machines
9. Clean and treat metals
10. Manufacture detail parts
11. Coordinate and assemble parts

Subject/Designation _ METAL SHAPING AND FORMING -

Level - Occupational Training
Title - Light Metal Fabrication CCDO# 8529

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Personal and vocational adjustment
2. Communication skills
3. Sketching and blueprint reading
4. Trade math and science
5. Materials
6. Workshop tools
7. Marking development
8. Cutting and forming
9. Thermal joining and cutting
10. Assembly, fastening and testing
11. Safety and accident prevention

MOTOR TRANSPORT

Subject/Designation - MOTOR TRANSPORT

Level - Occupational Training
Title - Ambulance Driver Attendant CCDO# 9179-146

by Holland College 1972

TPOS
1. Apply first aid
2. Select, operate and maintain F.A. equipment
3. Operate, maintain and handle emergency vehicles
4. Transport patients
5. Respond to emergency calls and control scene
6. Interpret and apply government laws and regulations
7. Develop personal competence

Subject/Designation _ MOTOR TRANSPORT

Level - Occupational Training
Title - Tractor Trailer Driver CCDO# 9175-122

by Confederation College

TPOS
1. Perform driving skills
2. Process driver responsibilities
3. Perform mechanical skills
4. Observe regulations

Subject/Designation - MOTOR TRANSPORT

Level - Occupational Training
Title - Truck Driver (Heavy and Light) CCDO#9175

by Job Corps 1969

TPOS
1. Use and practice safety and first aid procedures
2. Operate various types of vehicles, trucks, trailers
3. Identify and operate various types of equipment
4. Perform various vehicle manoevers
5. Operate on various road conditions
6. Connect, disconnect trailers
7. Operate two way radio
8. Apply local and road condition regulations
9. Perform cleaning and servicing operations on vehicle
10. Perform cargo handling operations
11. Perform emergency expedients
12. Fill out operator forms, records and reports

PRINTING

Subject/Designation - PRINTING

Level - Occupational Training
Title - Letterpress Machine Printing CCDO# 9512-186

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Personal and vocational adjustment
2. Safety and accident prevention
3. Printing processes and equipment
4. Paper
5. Inks and rollers
6. Proofing processes
7. Platen presses
8. Cylinder presses
9. Rotary presses
10. Imposition and printing surface
11. Make ready and pre make ready
12. Trade math and science
13. Communication skills

Subject/Designation - PRINTING

Level - Occupational Training
Title - Monotype Keyboard (Composition) CCDO# 9511-134

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Personal and vocational adjustment
2. Safety and accident prevention
3. Printing processes and procedures
4. Keyboard operation
5. Theory and calculations
6. Rules for composition
7. Hand composition
8. Casting for keyboard operators
9. Trade math and science
10. Communication skills

Subject/Designation - PRINTING

Level - Occupational Training
Title - Offset Printer CCDO# 9512

by Job Corps 1969

TPOS
1. Use safety procedures
2. Keep equipment clean
3. Repair, replace broken parts
4. Store material
5. Perform camera and darkroom procedures
6. Perfrom stripping operations
7. Perform platemaking operations
8. Perform offset press operations
9. Perform cutting and binding operations

Subject/Designation - PRINTING

Level - Occupational Training
Title - Lithographic Machine Printing CCDO# 9512-138

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Personal and vocational adjustment
2. Safety and accident prevention
3. Print processes and equipment litho
4. Paper and boards
5. Inks, inking and damping systems
6. Machine design and construction litho
7. Machine work
8. Plate making
9. Trade math and science
10. Communication skills

Subject/Designation - PRINTING

Level - Occupational Training
Title - Composition Work CCDO# 9511-110

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Personal and vocational adjustment
2. Safety and accident prevention
3. Printing processes and procedures
4. Paper
5. Composing room equipment and materials
6. Composing room calculations
7. Design and layout
8. Rules for composition
9. Hand composition
10. Handling mechanical composition
11. Imposition
12. Film and paper make up
13. Trade, math and science
14. Communication skills

PROCESSING

(Food & Beverage)

Subject/Designation - PROCESSING (Food & Beverage)

Level - Occupational Training
Title - Baker CCDO# 8213

by Job Corps 196?

TPOS
1. Use safety procedures
2. Apply rules of hygiene
3. Select and read recipes
4. Use knowledge of measurement (liquid units, dry units)
5. Use bakery goods preparation terms and baking terms
6. Use knowledge of action and use of ingredients
7. Use baking tools and implements
8. Operate major baking equipment
9. Perform baking operations
10. Perform bakery management procedures

REPAIRING & SERVICING

APPLIANCE SERVICE AND REPAIR

ELECTRICAL/ELECTRONIC REPAIR

METAL PRODUCTS

ELECTRICAL/ELECTRONIC EQUIPMENT

PRECISION INSTRUMENTS

ASSEMBLING TEXTILE PRODUCTS

MECHANICS AND REPAIRMEN

Subject/Designation - REPAIRING AND SERVICING

Level - Occupational Training
Title - Housing Maintenance Serviceman CCDO# 8799-194

by Government of the North West Territories 1975

TPOS
1. Perform heating repair and service
2. Perform minor electrical repairs
3. Perform minor plumbing repairs and maintenance
4. Do basic carpentry work
5. Do basic painting and decorating skills
6. Carry out fire prevention and safety functions
7. Apply basic administrative functions
8. Communicate effectively

Subject/Designation - REPAIRING AND SERVICING

Level - Occupational Training
Title - Farm Machinery Maintenance CCDO# 8584

by Holland College 1972

TPOS
1. Communicate effectively
2. Select, maintain, handle and operate shop tools, power tools
3. Identify, select and apply coolants, lubricants, fuels
4. Prepare equipment for storage
5. Prepare equipment for operation
6. Perform field maintenance troubleshooting
7. Service stationery equipment
8. Service self propelled equipment
9. Manage maintenance program

Subject/Designation - REPAIRING AND SERVICING - APPLIANCE REPAIR AND SERVICE

Level - Occupational Training
Title - Appliance Service Repairman CCDO# 8533-126

by Northern College 1973

TPOS
1. Communicate effectively in the work environment and apply good business practice
2. Apply mathematical operations to daily work
3. Use silver soldering and benchwork techniques
4. Apply diagnostic and test procedures and troubleshooting techniques
5. Service and repair laundry products
6. Service and repair kitchen products
7. Service and repair refrigeration equipment
8. Read and interpret basic and electrical blueprints and do basic sketching

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Subject/Designation - REPAIRING AND SERVICING - APPLIANCE REPAIR AND SERVICE

Level - Occupational Training
Title - Domestic Appliance Repair and Service CCDO#

by Nova Scotia Newstart 1970

TPOS
1. Communicate effectively in the work environment
2. Perform general duties
3. Use repair tools and equipment
4. Adjust and replace mechanical equipment and controls
5. Service, repair and overhaul transmissions and drives
6. Use measuring and testing devices
7. Service and repair electrical systems
8. Adjust and repair electrical controls
9. Service and repair engines
10. Service and repair electric motors
11. Install major appliances

Subject/Designation - REPAIRING AND SERVICING - APPLIANCE SERVICE AND REPAIR

Level - Occupational Training
Title - Electrical Appliance Repairman CCDO# 8533

by Job Corps 1969

TPOS
1. Use safety procedures
2. Use and maintain common hand tools and special tools
3. Use test and measuring equipment
4. Recognize and interpret diagrams, instrument reading codes, related information
5. Take inventory and order parts if necessary
6. Estimate cost and time of repairs
7. Perform circuitry repair operation
8. Perform electric motor and solenoid repairs
9. Perform heating element repair
10. Repair auxiliary systems 11. Perform associate, Misc. operations

Subject/Designation - ELECTRICAL/ELECTRONIC REPAIR

Level - Occupational Training
Title - Electronics - Home Entertainment CCDO# 8537-000

by Humber College 1973

TPOS
1. Comprehend introduction to course, instruction, content
2. Solve course related math problems
3. Select and use materials and components as used with course related systems
4. Select and use hand and power tools
5. Identify and analyze signals and electric laws
6. Read, interpret analyze and sketch technical drawings, specifications and instructional manuals
7. Select and use test equipment and procedures
8. Align home entertainment equipment
9. Trouble shoot and repqir home entertainment equipment
10. Identify, set up and operate home entertainment equipment
11. Deal with administrative and communication requirements and life skills

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Subject/Designation - REPAIRING AND SERVICING - ELECTRICAL/ELECTRONIC REPAIR

Level - Occupational Training
Title - Electronic Repair CCDO# 8535

by AVE, Nova Scotia 1973

TPOS
1. Measure physical parameters
2. Measure electrical parameters
3. Operate testing equipment
4. Read and interpret diagrams and specifications
5. Communicate effectively
6. Use and care for tools, equipment and materials
7. Perform math calculations
8. Analyze and trouble shoot electro mechanical equipment
9. Maintain operational equipment
10. Modify, adapt equipment to requirements
11. Repair electro mechanical equipment
12. Apply safety precautions

Subject/Designation - REPAIRING AND SERVICING - FABRICATING AND ASSEMBLING ELECTRICAL/ELECTRONIC EQUIPMENT

Level - Occupational Training
Title - Radio and Television Repair and Maintenance CCDO# 8534

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Personal and vocational adjustment
2. Safety and accident prevention
3. Workshop techniques

(Continued on next page)

Subject/Designation - REPAIRING AND SERVICING - FABRICATING AND ASSEMBLING ELECTRICAL/ ELECTRONIC EQUIPMENT

Title - Radio and Television Repair and Maintenance (Continued from previous page)

TPOS (Continued)

4. Understand electrical theory
5. Understand electronic theory
6. Repair and maintenance of disc and tape equipment
7. Repair of FM - AM receivers
8. Installation of television receivers
9. Repair of television receivers
10. Installation and repair of television antennae
11. Applied math
12. Sketching and blueprint reading
13. Communication skills

Subject/Designation - REPAIRING AND SERVICING - METAL PRODUCTS

Level - Occupational Training
Title - Manufactured Metal Products Assembler/Fabricator CCDO# 8520-000

by Humber College 1973

TPOS
1. Identify the assembly industries
2. Select, use and maintain hand tools
3. Identify and select assembly materials
4. Select and use measuring tools and perform shop calculations
5. Interpret assembly and detail drawings, shop sketches, blueprints and work order sheets
6. Select, use and maintain drilling and threading equipment
7. Select and install fastening devices
8. Operate welding and soldering equipment
9. Layout and fabricate assembly components
10. Assemble pre manufactured parts
11. Apply metal finishing techniques

Subject/ Designation - REPAIRING AND SERVICING - METAL PRODUCTS

Level - Occupational Training
Title - Radio and Television Repairman CCDO# 8534

by Job Corps 1969

TPOS
1. Use safety procedures
2. Use and maintain hand tools, special tools, test, measuring equipment'
3. Know and apply Ohms law
4. Apply characteristics of Series, parallel circuits

(continued on next page)

Subject/Designation - REPAIRING AND SERVICING - METAL PRODUCTS

Title - Radio and Television Repairmen (continued from previous page)

TPOS (Continued)

5. Know and apply basic AC and DC electric principles
6. Use knowledge of conductors and insulators characteristics
7. Know functions , operations and characteristics of electronic components and controlling components
8. Know function of electronic circuits
9. Recognize and interpret symbols, terms, reading and codes
10. Perform troubleshooting techniques
11. Install, remove components
12. Repair and align radio
13. Repair and align television
14. Install radio and tv

Subject/Designation - REPAIRING AND SERVICING - ELECTRICAL/ELECTRONIC EQUIPMENT

Level - Occupational Training
Title - Electronics Assembler CCDO# 8534

by Job Corps 1969

TPOS
1. Use safety procedures
2. Use and maintain common hand tools
3. Use and maintain special tools
4. Use and maintain test, measuring equipment
5. Recognize and interpret diagrams, symbols, terminology, readings and code
6. Perform layout and job preparation procedures
7. Perform proper operations re hardware, control and meter mounting
8. Install components
9. Repair defective equipment

Subject/Designation - REPAIRING AND SERVICING - PRECISION INSTRUMENTS

Level - Occupational Training
Title - Precision Instrument Technician CCDO# 8588-118

by Humber College

TPOS
1. Operate and maintain machine tools
2. Select , use and maintain hand tools
3. Use measuring equipment, mechanical, optical, electrical
4. Design assembly and testing devices
5. Repair, adjust and maintain instruments
6. Assemble instruments, mechanical, optical, electrical
7. Read and interpret blueprints and schematics
8. Identify and select materials and components
9. Communicate effectively

Subject/Designation - REPAIRING AND SERVICING - ASSEMBLING TEXTILE PRODUCTS 165

Level - Occupational Training
Title - Upholstering CCDO# 8562-110

by AVE, Nova Scotia 1973

TPOS
1. Communicate in occupation
2. Select and use tools
3. Strip material from furniture
4. Repair frames and restore finish on show wood
5. Prepare webbing and springs
6. Restuff and repad furniture
7. Identify, layout and cut material
8. Machine sew materials
9. Apply upholstery fabrics
10. Upholster cars, trucks , campers and boats
11. Make fabric repairs
12. Estimate and organize work

Subject/Designation - REPAIRING AND SERVICING - ASSEMBLING TEXTILE PRODUCTS

Level - Occupational Training
Title - Furniture Upholsterer CCDO# 8562-110

by Job Corps 1969

TPOS
1. Use safety precautions
2. Use and maintain common hand tools
3. Use and maintain special tools
4. Use and maintain equipment
5. Tell customer pros, cons of material
6. Estimate time and cost of repairs
7. Prepare furniture for repairs
8. Perform upholstery repair operations

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMAN

Level - Occupational Training
Title - Automotive Mechanic CCDO# 8581-111

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Personal and vocational adjustment
2. Engines - petrol and diesel - automotive mechanics
3. Lubrication and cooling systems
4. Fuel systems and carburetion

(continued on next page)

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Level - Occupational Training
Title - Automotive Mechanic (Continued from previous page)

TPOS (Continued)

5. Ignition system 1
6. Power transmission 1
7. Steering and suspension system
8. Braking systems
9. Chassis
10. Automotive electrics 1
11. Trade math and science
12. Print reading and sketching
13. Communication skills
14. Safety and accident prevention

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Level - Occupational Training
Title - Heavy Equipment Repair CCDO# 8584-378

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Personal and vocational adjustment
2. Engines- petrol and diesel
3. Lubrication and cooling systems
4. Fuel intake and exhaust systems
5. Electrical and ignition systems
6. Hydraulics
7. Power transmission
8. Braking systems
9. Steering and suspension systems
10. Undercarriage, frames and chassis
11. Trade math and science
12. Communication skills
13. Safety and accident prevention
14. Print reading and sketching

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Level - Occupational Training
Title - Photoelectronics CCDO#_____

by Humber College 1975

TPOS
1. Troubleshoot electronic circuits
2. Repair electronic flash units
3. Repair metering circuits in still and moving cameras
4. Repair control circuits in still and moving cameras and still projectors

(continued on next page)

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Title - Photoelectronics (Continued from previous page)

TPOS Continued

5. Repair audio circuits in sound cameras and projectors
6. Repair electronic motor speed control circuits

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Level - Occupational Training
Title - Camera Repair Mechanic CCDO# 8588-126

by Humber College 1973

TPOS
1. Identify, apply and operate photo equipment and process
2. Repair basic photographic equipment
3. Select and use measuring tools and equipment
4. Select and use hand and hand power tools
5. Select and use machine tools
6. Read, interpret and produce technical drawings
7. Select and use materials related to photo equipment
8. Solve math problems related to photographic equipment repair
9. Deal with administrative and communicative requirements

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Level - Occupational Training
Title - Fitter (Mechanical Maintenance) CCDO# 8799-126

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Personal and vocational adjustment
2. Safety and accident prevention
3. Measurement
4. Marking off
5. Benchwork and fitting
6. Properties of ferrous, non ferrous metals and non metals
7. Forging and heat treatment
8. Power saws
9. Drilling machines
10. Lathes
11. Shapers
12. Installing and repairing machinery and equipment
13. Brazing flame welding and cutting
14. Rigging
15. Sketching, drawings, and blueprint reading
16. Trade math and science
17. Communication skills

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Level - Occupational Training
Title - Vehicle Body Repair CCDO# 8581-111

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Personal and vocational adjustment
2. Body workshop practices
3. Workshop materials
4. Thermal joining cutting
5. Replace hardware trimming and glass
6. Repair and replace radiators and petrol diesel tanks
7. Repair and replace panels
8. Replace electrical components
9. Straighten frames
10. Spray paint and refinish
11. Safety and accident prevention
12. Trade math and science
13. Sketching and blueprint reading
14. Communication skills

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Level - Adult
Title - Heavy Duty Equipment Mechanic CCDO# 8584-378

by Confederation College 1975

TPOS
1. Engines
2. Diesel fuel injection systems - Bosch
3. PT Cummings fuel injection system
4. Caterpillar duel injection system
5. Roosamaster
6. Chassis
7. Simms
8. Hydraulics
9. General motors, international
10. Electrical

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Level - Occupational Training
Title - Small Engines Maintenance CCDO#

by Northern College 1973

TPOS
1. Communicate effectively in the work environment
2. Perform general duties and practice safety
3. Use automotive shop equipment
4. Use repair tools and equipment
5. Adjust and replace mechanical equipment and controls

(continued on next page)

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Title - Small Engines Maintenance (Continued from previous page)

TPOS (Continued)

6. Use measuring and testing devices
7. Service and repair steering suspension and brake systems
8. Service and repair cooling and exhaust systems

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Level - Occupational Training
Title - Instrumentation Mechanic CCDO# 8588-118

by Humber College 1974

TPOS
1. Comprehend the introduction to course, instruction, contents
2. Solve course related math problems
3. Select and use materials and components as used with course related systems
4. Select and use hand and power tools
5. Identify and analyze signals and electrical laws
6. Read, interpret, analyze and sketch technical drawings, specifications and instructions
7. Select and use test equipment to ISA standards
8. Install, calibrate and analyze instrument systems
9. Align instruments and systems
10. Design and operate process control systems
11. Trouble shoot and repair instruments and systems
12. Deal with administrative and communications requirements

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Level - Occupational Training
Title - Air Conditioning Installer CCDO#

by Job Corps 1969

TPOS
1. Observe safety practices
2. Care for and use common and special tools
3. Care for and use properly measuring and testing equipment
4. Estimate cost of installation
5. Estimate cooling requirements
6. Follow plans and diagrams
7. Convert furnace and install large domestic air conditioning
8. Install domestic window type air conditioner

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Level - Occupational Training
Title - Industrial Maintenance Mechanic (Packaging) CCDO# 8584

by Humber College 1974

TPOS
1. Describe industries scope, materials, equipment terms
2. Identify and use safest procedures in packaging equipment
3. Use and care for measuring equipment
4. Read and interpret engineering drawings
5. Identify, use and care for hand tools
6. Use marking out equipment and bench tools to produce part to drawing tolerances
7. Use welding equipment to join ferrous metals
8. Use soldering and brazing equipment to join metals
9. Use drills, taps, reamers, c'sk and c bores to produce p part to drawing specs.
10. Turn and bore on lathe to drawing specs.
11. Use mills, and surface grinder to produce part to drg. series
12. Maintain, repair and replace power transmission components
13. Adjust, maintain and replace mechanical actuators
14. Adjust and maintain material handling systems
15. Identify, maintain and replace electrical components
16. Maintain, repair and replace fluid power components
17. Maintain, repair and adjust control systems
18. Identify and solve common packaging machine problems

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Level - Occupational Training
Title - Office Machine Repair CCDO# 8585

by Job Corps 1969

TPOS
1. Use safety procedures
2. Use and maintain hand tools and special tools
3. Use and maintain test equipment
4. Read and interpret repair manuals
5. Negotiate preventive maintenance
6. Estimate time and cost of repairs
7. Use correctly soldering equipment
8. Prepare, perform typewriter repair operations - remove, replace, adjust
9. Perform calculator repairs
10. Perform mis. machine repairs - adding machines, card sorting machines, billing machines, tabulating and embossing machines

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Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Level - Occupational Training
Title - Air Conditioning and Refrigeration Mechanic CCDO# 8733-114

by Job Corps 1969

TPOS
1. Use safety procedures in working with tools, refrigerants

(continued on next page)

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Title - Air Conditioning and Refrigeration Mechanic (Continued from previous page)

TPOS (Continued)

2. Use properly tools and test equipment with vocational area
3. Apply electrical and thermodynamic principles
4. Estimate cost of repair
5. Read blueprints
6. Replace properly lines and fitting
7. Replace refrigerant within a cooling system
8. Repair and maintain refrigerant and air conditioning parts
9. Repair and maintain refrigerant and air conditioning controls
10. Perform post repair operations

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Level - Occupational Training
Title - Small Gas Engine Repair CCDO# 8589

by Job Corps 1969

TPOS
1. Use safety procedures
2. Use and maintain tools and measuring , test equipment
3. Interpret repair manuals
4. Take inventory of parts and order parts if necessary
5. Know 2 and 4 stroke engines and be able to identify various engines
6. Troubleshoot equipment
7. Estimate time and cost of repair
8. Clean, test, replace and repair parts of ignition systems
9. Adjust, clean, replace and repair parts of caburetor
10. Remove reface, clean and grind, replace parts of valve train
11. Perform engine repair operations
12. Repair, replace lubrication systems
13. Perform common engine related repairs

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Level - Occupational Training
Title - Marine and Small Power Equipment Mechanic CCDO# 8592-000

by Humber College 1974

TPOS
1. Plant and shop safety
2. Locate, maintain and use reference materials
3. Maintain, identify, select and use hand tools
4. Describe basic 2 and 4 stroke engine theory and function

(continued on next page)

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN 172.

Title - Marine and Small Power Equipment Mechanic (continued from previous page)

TPOS (Continued)

5. Identify types of lubricants, greases and their applications
6. Identify and explain operation of fuel systems
7. Identify and explain operation of ignition system
8. Identify, select and use and maintain measuring equipment
9. Identify and explain operation of electrical system
10. Identify, select and use joining materials
11. Disassemble, reassemble, measure component parts of two stroke cycle short block assembly
12. Disassemble, reassemble, measure component parts of four stroke cycle short block assembly
13. Disassemble, reassemble, adjust, lubricate and sharpen lawnmowers
14. Adjust, lubricate, overhaul riding tractor running gear and transmission and service electrical systems
15. Adjust, lubricate and overhaul drive system, tine and transmission tiller
16. Disassemble, reassemble, lubricate and adjust edger drive systems

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Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Level - Occupational Training
Title - Heavy Duty Equipment Mechanic CCDO# 8584-378

by Northern College 1973

TPOS
1. Communicate in the work environment
2. Perform mathematical operations
3. Apply scientific principles
4. Perform general duties
5. Explain and outline operation of internal combustion engines
6. Check and overhaul engine components
7. Check and overhaul belt and chain drivers
8. Check and overhaul exhaust systems
9. Relate types and functions of electrical systems
10. Repair and overhaul electrical systems
11. Identify types and explain functions of power trains
12. Repair and overhaul power trains
13. Identify types and explain functions of running gear wheel and crawler vehicles.
14. Repair running gear

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Level - Occupational Training
Title - Motor Vehicle Repair (Mechan.) CCDO# 8581-111

by AVE, Nova Scotia 1973

TPOS
1. Communicate effectively in the work environment
2. Perform general shop duties
3. Use automotive shop equipment
4. Use repair tools and equipment
5. Adjust and replace mechanical equipment and controls
6. Use measuring and testing devices
7. Service and repair steering, suspension and brake systems
8. Service and repair cooling and exhaust systems
9. Service and repair fuel systems
10. Service and repair electrical systems
11. Service, repair and overhaul transmissions and drives
12. Service and repair engines
13. Service and overhaul engines

Subject/Designation - REPAIRING AND SERVICING - MECHANICS AND REPAIRMEN

Level - Occupational Training
Title - Motor Vehicle Repair (Body) CCDO# 8581-111

by AVE, Nova Scotia 1973

TPOS
1. Communicate effectively in the work environment
2. Perform general shop duties
3. Use repair tools and equipment
4. Adjust and replace mechanical equipment and controls
5. Use measuring and testing devices
6. Service and repair steering, suspension and brake systems and cooling devices
7. Service and repair electrical systems
8. Remove and replace components parts of automobiles
9. Select, use materials, prime and paint
10. Straighten and align framework
11. Shape body contours

SALES

CARPETING

Subject/Designation - SALES -

Level - Occupational Training
Title - Appraisal and Assessment of Real Property CCDO# 5172-110

by Holland College 1972

TPOS
1. Communicate effectively and develop personal competence
2. Interpret and apply legal aspects of real estate
3. Prepare graphic presentations
4. Inspect and classify improvements
5. Compile and organize information
6. Apply real estate math and statistics for appraisal purposes
7. Analyze factors contributing to highest and best use
8. Apply evaluation methods
9. Inspect, describe and inventory land
10. Plan and control program of work

Subject/Designation - SALES

Level - Occupational Training
Title - General Sales Clerk CCDO# 5137

by AVE, Nova Scotia 1973

TPOS
1. Perform cashier duties
2. Control stock
3. Price and code
4. Merchandise goods
5. Perform general housekeeping
6. Apply store policy
7. Develop product knowledge
8. Assist customers
9. Take inventories
10. Receive merchandise
11. Communicate effectively

Subject/Designation - SALES

Level - Occupational Training
Title - Building Supplies Sales CCDO# 5135

by AVE, Nova Scotia 1973

TPOS
1. Maintain stock and organize work
2. Provide service to customers
3. Communicate effectively
4. Sell product

(continued on next page)

Subject/Designation - SALES

Title - Building Supplies Sales (Continued from previous page)

TPOS (Continued)

5. Use and care for tools and equipment
6. Develop and apply product knowledge
7. Develop and price estimates and products
8. Merchandise
9. Perform commercial math calculations
10. Identify and correlate sources of information
11. Make out and complete forms and documentation
12. Promote business

Subject/Designation - SALES

Level - Occupational Training
Title - Retail Sales Clerk CCDO# 5137-114

by Job Corps 1969

TPOS
1. Maintain good public relations with customers
2. Maintain clean and orderly display of non defective merchandise
3. Utilize knowledge of selling points, value of merchandise
4. Assist customer in choosing merchandise
5. Demonstrate article and instruct customer in its care and use
6. Create desire for product, close sale and suggest purchase of additional goods
7. Arrange delivery if necessary
8. Replace display with new merchandise
9. Keep record of sales
10. Meet objectives and handle complaints and give general assistance

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Subject/Designation - SALES - CARPETING

Level - Occupational Training
Title - Sales Specialist - Carpeting CCDO# 5130

by Humber College 1973

TPOS
1. Identify types of carpet manufacturing processes
2. Analyze and evaluate carpet systems
3. Identify carpet constructions components specifications
4. Analyze and evaluate installation systems
5. Recommend maintenance program for carpets
6. Sell goods and services
7. Communicate effectively
8. Interpret and apply related laws and standards, business practices
9. Apply business operating procedures

this and 3 other related charts have been combined for one post secondary program - Resilient flooring specialist, retail sales specialist and installation specialist technician

Subject/Designation - SALES - CARPETING

Level - Occupational Training
Title - Retail Sales Specialist (Carpeting) CCDO# 5130

by Humber College 1973

TPOS
1. Communicate effectively
2. Make calculations re estimates, layouts, costs, (lower skill level)
3. Apply sales techniques
4. Implement retail procedures
5. Apply product knowledge to sales situations
6. Apply basic colour and decor principles

this and 3 other charts have been combined for one post secondary program, Resilient flooring specialist, sales specialist (carpeting) and installation specialist technician.

SERVICES

FOOD/BEVERAGE
PREPARATION AND SERVICE

HOUSEKEEPING

LODGING AND
ACCOMMODATION

Subject/Designation - SERVICES - FOOD AND BEVERAGE PREPARATION & SERVICE

Level - Occupational Training
Title - Food Preparation (Basic) CCDO# 6121-144

by Confederation College

TPOS
1. Develop personal and vocational skills
2. Apply safety and accident prevention procedures
3. Apply elements of kitchen management
4. Operate and maintain kitchen equipment
5. Prepare, cook and serve vegetables
6. Prepare, cook and serve stocks, sauces and soups
7. Prepare, cook and serve meat and poultry
8. Prepare, cook and serve seafood
9. Prepare, cook and serve dairy products and egg dishes
10. Prepare, cook and serve desserts
11. Prepare, cook and serve cold kitchen products
12. Prepare, cook and serve cereal and pasta dishes
13. Prepare, cook and serve bakery products
14. Prepare and serve beverages
15. Cut meta, poultry and fish
16. Use applied mathematics

Subject/Designation - SERVICES - FOOD AND BEVERAGE PREPARATION & SERVICE

Level - Occupational Training
Title - Bartending and Service CCDO# 6123-111

by AVE, Nova Scotia 1973

TPOS
1. Maintain inventory
2. Operate service bar
3. Communicate effectively with customers
4. Prepare bar for opening and closing
5. Maintain clean equipment
6. Operate cash systems
7. Mix drinks
8. Care for and serve wine, beer, spirits and liquors
9. Serve
10. Supervise staff
11. Develop personal characteristics

Subject/Designation - SERVICES - FOOD AND BEVERAGE PREPARATION & SERVICE

Level - Occupational Training
Title - Retail Meatcutting CCDO#

by AVE, Nova Scotia 1974

TPOS
1. Communicate effectively

(Continued on next page)

Subject/Designation - SERVICES - FOOD AND BEVERAGE PREPARATION & SERVICE

Title - Retail Meatcutting (Continued from previous page)

TPOS (Continued)

2. Use and care for tools, equipment and supplies
3. Develop product knowledge
4. Make basic meat cuts
5. Merchandise meats
6. Receive and store products
7. Perform general housekeeping
8. Take inventory
9. Merchandise variety, offals and smoked meats
10. Merchandise fish and poultry

Subject/Designation - SERVICES - FOOD AND BEVERAGE PREPARATION & SERVICE

Level - Occupational Training
Title - Cook Training CCDO# 6121-111

by Dept. of Education, B.C. 1972

TPOS
1. Develop personal and vocational skills
2. Apply safety and accident prevention procedures
3. Apply elements of kitchen management
4. Operate and maintain kitchen equipment
5. Prepare, cook and serve vegetables
6. Prepare, cook and serve stocks, sauces and soups
7. Prepare, cook and serve meat and poultry
8. Prepare, cook and serve seafood
9. Prepare, cook and serve dairy products and egg dishes
10. Prepare, cook and serve desserts
11. Prepare, cook and serve cold kitchen products
12. Prepare, cook and serve cereal and pasta dishes
13. Prepare, cook and serve bakery products
14. Prepare and serve beverages
15. Cut meat, poultry and fish
16. Use applied mathematics

Subject/Designation - SERVICES - FOOD AND BEVERAGE PREPARATION & SERVICE

Level - Occupational Training
Title - Dining Waitress/Hostess Service CCDO# 6125-111

by AVE, Nova Scotia 1973

TPOS
1. Work stations and sections
2. Take, place orders and make suggestions
3. Communicate with customers

(Continued on next page)

Subject/Designation - SERVICES - FOOD AND BEVERAGE PREPARATION & SERVICE

Title - Dining Waitress-Hostess Service (Continued from previous page)

TPOS (Continued)

4. Communicate with and work with others
5. Maintain personal appearance and hygiene
6. Prepare tables
7. Serve liquor and wines
8. Act as a cashier
9. Do side work
10. Prepare and serve foods
11. Serve as a hostess or head waitress

Subject/Designation - SERVICES - FOOD AND BEVERAGE PREPARATION & SERVICE

Level - Occupational Training
Title - Cooking CCDO# 6121-111

by Nova Scotia Newstart 1970

TPOS
1. Deep fry
2. Panfry, broil and bake
3. Cook vegetables
4. Plan menus, portion and display foods
5. Order, handle and store foods
6. Prepare soups, chowders and sauces
7. Make break, pastries and desserts
8. Use and maintain tools and equipment
9. Prepare sandwiches, salads and cold plates

Subject/Designation - SERVICES - FOOD AND BEVERAGE PREPARATION & SERVICE

Level - Occupational Training
Title - Food Service and Hotel Administration CCDO#

by Northern College 1972

TPOS
1. Communicate effectively with customers, fellow workers and supervisors
2. Order, set and serve meals
3. Order, and make up popular soda fountain items
4. Supervise kitchen and restaurant operations
5. Function in front office as day clerk
6. Book, service and function within the catering office
7. Function as maid or inspectress within housekeeping department
8. Function within a bar or lounge operation
9. Coordinate reservations with front office in both resort and commercial houses
10. Communicate effectively and develop personal competence
11. Supervise hotel services and promote facilities

Subject/Designation - SERVICES - FOOD AND BEVERAGE PREPARATION & SERVICE

Level - Occupational Training
Title - Waiter/Waitress CCDO# 6125-126

by Dept. of Education, B.C. 1973

TPOS
1. Develop personal and vocational skills
2. Apply safety and accident prevention procedures
3. Maintain suitable grooming and personal hygiene
4. Apply sanitary food service procedures
5. Identify, select and use food and beverage equipment and tableware
6. Apply effective menu use and selling technique
7. Apply customer relations procedures
8. Apply counter or coffee shop procedures
9. Apply dining room service procedures
10. Apply beverage service procedures
11. Apply special functions service procedures
12. Apply ordering and guest check procedures
13. Apply elements of management related to food and beverage service

note - uses tracks or grouping - divided into 3 phases of 120 hours each, includes an advanced phase with options

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Subject/Designation - SERVICES - HOUSEKEEPING

Level - Occupational Training
Title - Trained Homemaker CCDO#6149-130

by Dept. of Education, B.C. 1973

TPOS
1. Develop personal and vocational skills
2. Apply and teach safety and first aid in the home
3. Apply and teach principles of health and sanitation in the home
4. Apply and teach planning, preparing, serving of meals and subsequent clean up
5. Practice and teach budgeting
6. Apply and teach general housekeeping procedures
7. Assist with health care needs of a family
8. Assits in meeting the needs for self esteem, achievement love and affection
9. Communicate effectively as a member of a health team and work efficiently with others

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Subject/Designation - SERVICES - HOUSEKEEPING

Level - Occupational Training
Title - Housekeeping - Homemaking Training CCDO# 6149-130

by Nova Scotia Newstart 1970

TPOS
1. Manage the household
2. Maintain and clean household
3. Do laundry and care for clothing and linens

(continued on next page)

Subject/Designation - SERVICES - HOUSEKEEPING

Title - Housekeeping - Homemaker Training (Continued from previous page)

TPOS (Continued)

4. Care for and use appliances, utensils and dishes
5. Cook and serve vegetables
6. Cook and serve meats, fish and poultry
7. Prepare and serve breakfasts, snacks and lunches
8. Prepare and serve desserts
9. Care for children
10. Care for elderly , chronically ill and convalescents
11. Develop personal competence

Subject/Designation - SERVICES - LODGING AND ACCOMODATION

Level - Occuational Training
Title - Hotel-Motel Houseeeping Services CCDO# _____

by AVE, Nova Scotia 1973

TPOS
1. Organize and supervise work
2. Clean kitchenettes
3. Organize care for and use equipment and supplies
4. Communicate and work with others
5. Clean and equip bathrooms and washrooms
6. Clean rooms, corridors and offices
7. Observe safety and house rules
8. Do laundry

Subject/Designation - SERVICES - LODGING AND ACCOMODATION

Level - Occupational Training
Title - Hotel-Motel Restaurant Management CCDO#_____

by Holland College 1971

TPOS
1. Recognize and provide for individual wants and needs
2. Communicate effectively and develop personal competence
3. Select, train and supervise staff
4. Manage front desk operations
5. Operate and maintain food services
6. Operate and maintain beverage services
7. Manage housekeeping activities
8. Plan and develop purchasing procedures
9. Manage and control cost of operations
10. Plan and organize service areas
11. Plan and organize promotional activities
12. Implement and control sanitation programs
13. Set up and control maintenance and safety programs
14. Interpret and apply government regulations

Subject/Designation - SERVICES - PROTECTIVE SERVICE

Level - Post Secondary
Title - Police Technology CCDO# 6112

by Holland College, PEI 1971

TPOS
1. Communicate effectively
2. Identify, select and handle equipment
3. Patrol and maintain security of area
4. Prepare and maintain records and statistics
5. Conduct investigations
6. Interpret laws and apply powers of arrest
7. Prepare and present evidence in court
8. Organize and manage, operate police services
9. Develop personal competence and attitudes

SOCIAL SERVICES

Subject/Designation - SOCIAL SERVICES

Level - Adult
Title - Recreation Facility Management CCDO# 2333-110

by Algonquin College 1975

TPOS
1. Apply concepts and philosophies of recreation in developing programs
2. Manage personnel
3. Budget, implement, control, organize
4. Identify, appreciate, monitor, maintenance needs
5. Communicate effectively
6. Design and implement safety, security program
7. Supervise an office
8. Purchase equipment and supplies
9. Apply basics of ground and equipment maintenance
10. Parks, trails, grass,trees.

Subject/Designation - SOCIAL SERVICES

Level - Adult
Title - Recreation Leadership CCDO# 2799-110

by Algonquin College 1975

TPOS
1. Politics and recreation
2. Leadership
3. Staff management paid and volunteer
4. On going development of professional and personal competencies
5. Recreation administration
6. Facility and equipment management
7. Public relations
8. Budget
9. Teaching skills
10. Program planning
11. Facility design and construction
12. Program implementation
13. Relate to specialists

Subject/Designation - SOCIAL SERVICES (science)

Level - Occupational Training
Title - Library Administration (Commission Library) CCDO# 2553

by Technical Services Branch, Lusaka, Zambia 1971

TPOS
1. Commission library services
2. Trades training - institute, libraries
3. Institutes of technology and applied arts libraries

(continued on next page)

Subject/Designation - SOCIAL SERVICES

Title - Library Administration (Commission Library) (Continued from previous page)

TPOS (Continued)

4. Selecting and ordering text ref. materials for trades training institutes
5. Receiving, cataloguing and distribution for trades training institutes
6. AV cataloguing and distribution
7. Microfilm cataloguing and distribution
8. Accounting

Subject/Designation - SOCIAL SERVICES

Level - Occupational Training
Title - District Management CCDO# 2350

by Information Canada 1973

TPOS
1. Plan
2. Communicate effectively
3. Develop and adapt systems
4. Communicate with public
5. Analyze and evaluate
6. Establish and maintain relationships within Federal Public Service and I.C.
7. Organize material resources and administer office procedures
8. Manage finances
9. Organize and manage human resources
10. Report

Subject/Designation - SOCIAL SERVICES

Level - Occupational Training
Title - Enquiry/Information Service CCDO# 2353

by Information Canada 1973

TPOS
1. Handle telephone enquiries
2. Handle walk in enquiries
3. Handle correspondence
4. Receive information
5. Retrieve and consolidate information
6. Perform office functions
7. Operate information retrieval systems
8. Function as a member of a team
9. Provide liason
10. Provide support services
11. Anticipate and identify information needs

Subject/Designation - SOCIAL SERVICES

Level - Occupational Training
Title - Mobile Information Services CCDO# 2353

by Information Canada 1972

TPOS
1. Research information
2. Identify individual information needs
3. Provide required information
4. Obtain information on services
5. Gather and summarize feedback
6. Establish credibility
7. Respond to needs of departments
8. Utilize and support community information
9. Organize and manage work

Subject/Designation - SOCIAL SERVICES

Level - Occupational Training
Title - Resources Planning CCDO# 2319-130

by Holland College 1973

TPOS
1. Apply existing legislation related to planning
2. Gather and compile information
3. Analyze and report data
4. Prepare grahpic presentations
5. Prepare maps
6. Conduct on site inspection and supervision
7. Carry out physical site design
8. Identify resources use conflicts and problems
9. Organize and coordinate participation in planning
10. Manage planning office
11. Communicate effectively

Subject/Designation - SOCIAL SERVICES

Level - Occupational Training
Title - Youth Work CCDO# 2339-199

by Nova Scotia Youth Agency 1972

TPOS
1. Grow and develop
2. Communicate and counsel
3. Initiate, organize and develop programs
4. Evaluate programs and activities
5. Administrate

(continued on next page)

Subject/Designation - SOCIAL SERVICE

Title - Youth Work (Continued from previous page)

TPOS (Continued)

6. Work with groups
7. Stimulate learning
8. Work with individuals
9. Diagnose or assess community
10. Work through bureaucratic organizations

Subject/Designation - SOCIAL SERVICE

Level - Occupational Training
Title - Indigenous Community Work CCDO#_____

by Continuing Education, Nova Scotia 1974

TPOS
1. Diagnose and assess communities
2. Meet people
3. Organize groups
4. Work with groups
5. Work with individuals
6. Work with agencies
7. Initiate and develop programs
8. Communicate
9. Handle change
10. Deal with apathy and negativism
11. Organize and administer work

Subject/Designation - SOCIAL SERVICE

Level - Occupational Training
Title - Psychological Counselling CCDO# 2315-138

by University of Victoria, B.C. 1973

TPOS
1. Communicate and relate
2. Identify and specify problems and client needs
3. Apply counselling methods
4. Apply special group counselling methods
5. Measure and evaluate
6. Serve as a consultant
7. Apply behaviour change techniques
8. Administer program of services

(continued on next page)

Subject/Designation - SOCIAL SERVICES

Title - Psychological Counselling (continued from previous page)

TPOS (Continued)

9. Organize, conduct vocational and educational counselling programs
10. Enlist and utilize community services
11. Employ effective instruction techniques
12. Develop and implement programs in psychological education
13. Continue to acquire professional competence

WATER TRANSPORT

Subject/Designation - WATER TRANSPORT

Level - Occupational Training
Title - Marine Engineering (Fishing) CCDO# 9135

by AVE, Nova Scotia 1974

TPOS
1. Perform fire and emergency procedures
2. Operate engines
3. Maintain engines
4. Select, use and care for tools and equipment
5. Operate and maintain compressed air systems
6. Operate fuel and lubricating systems
7. Operate and maintain electrical systems
8. Operate and maintain hydraulic systems
9. Operate and maintain pumps and winches
10. Main'ain and repair process equipment and refrigeration

PART V

IMPLICATIONS AND CONCLUSIONS

SUMMARY OF ADVANTAGES AND DISADVANTAGES

Advantages

1. Chart is a device for staging systematic instructional development.
2. DACUM is a flexible tool, not an end in itself.
3. It can be done quickly.
4. It is a way of becoming responsive to local and community needs.
5. The chart allows for rational evaluation of students.
6. The instructor can get a picture of the entire program.
7. DACUM charting aids communication, pre-requisite identification and student tracking (monitoring) are made easier. Other institutions, instructors and agencies can easily see the nature of the program.

Disadvantages

1. The specificity of the chart depends heavily upon the skill and expertise of the co-ordinators.
2. The DACUM committee can reflect local biases.
3. The committee may build upward mobility into the chart - making the job look more difficult than it is.
4. Additional skills are required to operationalize charts.
5. DACUM charting does not help with deciding on or developing ways for students to learn.
6. Instructors may ignore the behavioural statements and proceed with content.
7. DACUM charting has not been shown to apply to all areas, it works well with skills.

COMMENTS AND SOME SPECULATION

DACUM is a relatively recent innovation. It is obviously being used, implemented and applied in a number of different ways. The first part of the paper attempted to put DACUM in perspective. There is a great temptation (and often with good justification) to cry BANDWAGON! If one takes a curriculum development position somewhere in the Systematic or goal oriented camp, then DACUM is embedded in a solid theory base. It can be one more tool for the developer.

Another word that is often associated with a popular innovation is PANACEA. Most of the work has been done in the skill areas dealing with occupational training. How well the DACUM process can be adopted for a complete range of educational programs remains to be seen.

The strength of DACUM is its analytic character and the way it can involve people outside of education in the curriculum field. Perhaps some curricula do not require systematic analysis techniques and must be primarily developed by people within education. In other words there may be a whole range of techniques and procedures which are applied in appropriate situations after due consideration.

In order to make full use of the materials presented in this paper the reader should be aware of some of the developments and techniques within the growing field of Educational Technology. Familiarity with the CCDO is also helpful in establishing job fields, classifications and descriptions. We will now project a little on how this innovation may affect education and training and speculate

upon the direction which Curriculum Development is taking.

Greater curriculum flexibility seems to be an emerging need. The concept of the "open college" is referred to more and more often. An ideal open college system would allow just about anyone to take any curriculum mix they wanted or needed in a learning style or mode that best suited them at any time of the day or year. Such an all-encompassing system would be enormously expensive, but certain reasonable trade-offs can be made which will allow for at least a partial meeting of the goal.

The concept of learning objectives (sometimes called performance objectives or behavioural objectives) is connected with DACUM charting. Learning objectives tend to break up whole areas of endeavour into discrete chunks. If present and future curricula are set out in terms of these discrete chunks these can be treated as data bits.

Computer techniques now exist which can set up large data bases with curriculum bits or objectives arranged within matrices or profiles. If we consider curriculum and DACUM to be dealing primarily with WHAT has to be learned and we build another parallel system which deals with the HOW, or the materials needed for learning, then we have the elements of a highly flexible system. The third key element to be added of course is HOW WELL or evaluation.

It will be possible to operate a Computer Managed Instructional System which comes very close to meeting the "open college" concept. Naturally we have over-simplified the situation, but DACUM is one way that such a data base of objectives could be built. Once the information is in the system according to activity and content then

pieces of it could be retrieved to build new combinations, i.e. unique courses to meet individual needs.

What would be some of the implications of such a system?

1. A measurable, behavioural approach to curriculum building could be introduced (if such were deemed desirable).
2. The business, industry and local community could become much more involved in shaping curriculum. Local decision making is possible.
3. Communication between institutions, regions, provinces would be possible with respect to curriculum requirements, expectations and standards. (Student transferability)
4. The world of work could become a much more realistic element within the curriculum by using the CCDO and building in job mobility.
5. Curriculum and instructional materials which have been already developed could be integrated into a larger system, hence helping to validate and improve such material through broader use.
6. New and existing curricula could go through some process similar to DACUM in order to allow them to become part of the data base.
7. The Ontario Ministry of Colleges and Universities has a very large, on the shelf, collection of training modules developed for the apprenticeship system which could be integrated into the whole system.

8. It is becoming evident that generic rather than specific skills need to be identified with respect to broad occupational areas or job families. DACUM charts and the analysis of data generated by charts in related jobs would allow us to do that.

9. Once a chart or set of objectives is established to meet an individual's needs then the pre-requisites can be easily identified by further analysis of the objectives and a knowledge of the related generic skills for the field. These can be tested for or added to the student's program.

10. Students following a particular chart are responsible for completing the objectives as stated, but the onus is also on the instructor to manage the learning environment so that the student can be successful. In other words, charts introduce accountability.

11. Computer-managed data (or careful people-managed data) can give information about the numbers of students who have or will be involved in certain learning experiences. This allows for more effective budgeting.

12. As in the last point, more effective staff planning could be possible.

13. Updating becomes less of a problem when the data is available via charts or in the computer.

14. Inter-agency and inter-institution co-operation on curriculum development becomes much more viable (assuming it is desired).

15. Information between training and funding agencies becomes easier to exchange. For example, funding could be on the basis of objectives contracted rather than hours or weeks contracted.

16. The computer-managed system could be extended to include tracking systems and begin forming records and statistics about the nature of the labour force. This would be essential to a Manpower policy scheme.

17. The system of short monographs now used to give narrative descriptions of courses could still be used, but terminal performance objectives could be added to make such monographs even more meaningful.

18. It is obvious that some central agency will have to begin training people in these new techniques and procedures.

19. The use of DACUM and a computer-managed data base does not limit the variety of delivery and evaluation systems possible. There must of course be some common forms and procedures, but the HOW and HOW WELL aspects of instruction can differ from place to place.

20. The DACUM Exchange (DEX) is now a real possibility. In the Spring of 1975, the College Bibliocentre became part of Centennial College. Because of their new position, they were not able to continue the distribution of the charts. Therefore, the DEX has now been established at Humber Lakeshore on a provisional basis. It is our hope to obtain funding to enable us to continue this service.

These 20 points represent only a few of the real or speculative considerations for the application of DACUM in retraining and Post Secondary Curriculum development.

EPILOGUE - PART A

199

DACUM, CCDO and all that

BY

G. H. WRIGHT

For those seeking some guidance on the how, what and why of DACUM (Developing a curriculum, or Designing a curriculum) a recent publication by Bill Sinnett will prove a very useful handbook.

> Application of Dacum in retraining and post-secondary curriculum developed by William E. Sinnett, Randa Division, Humber College of Applied Arts and Technology,

This guide is timely and necessary, for even in Ontario various adaptations and uses of the process to analyze occupations and disciplines is occurring. Whilst, in an emerging technique there is advantage in individual endeavour, the growing application and diversity in utility indicates that those involved need to co-operate more fully. If we seek to supply a mobile labour force, then there must be commonly acceptable standards of achievement and performance. Bill Sinnett, concerned with this philosophy, offers some ideas to those who are examining or applying DACUM.

To provide the reader with perspective for projecting and predicting Dacum evolvement, part one provides a review of current literature on 'front-end analysis'. If you are not sure of the meaning of 'front-end analysis', I can at least say that in this context it apparently has no connection with aviation, automobiles or pornography!

The commentary on Dacum as it is being implemented, and the suggestions on procedures to adopt in establishing a Dacum chart, provide useful advice for those seeking guidance.

Included in the work is a synopsis of 103 Dacum Charts (see list) classified under subject, level and title. The synopsis provides a list of each of the terminal performance objectives. The original charts are lodged at the College Bibliocentre. It is hoped that anyone producing a Dacum Chart in future will send it to the College Bibliocentre for general distribution. The possibility that such data can be input into a computer to facilitate updating and retrieving performance objectives, forms one of the twenty points listed for the application of Dacum.

There is a need to re-examine the coding, both in relation to the present use of CCDO and the matrix for Dacum. The CCDO should be applied in such a way that it does succeed in identifying specific College programs and their levels within occupational and academic clusters. The following breakdown may be helpful in this regard.

College Bibliocentre Newsletter No. 13 - Sept. 1974

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The 'CCDO' Code when applied should distinguish the following elements of information.

a. occupational classification;
b. identify specific job subdivision within classification;
c. indicate type of course;
d. length of course;
e. identify College/Campus.

recommended codes for this purpose are defined as follows:

occupational classification

CCDO Number comprises 4 digits - the first two defining a major division and the next two digits a minor subdivision of occupations

and 3 digits used consecutively to define specific occupational units within the major divisions

thus, to code Industrial Instrumentation Technician
2165 signifies Architectural and Engineering Technologists and Technicians

299 signifies other Engineering Technicians e.g. there is no specific occupational description for an Industrial Instrumentation Technician

The CCDO Number then for Industrial Instrumentation Technician = 2165.299.

specific job subdivision

There are a number of instances in CCDO where the original number is insufficient to indicate a College Course with specificity. A 2-digit code should be used for this purpose as a consecutive number to identify uniquely the occupation.

Thus, to specify Industrial Instrumentation Technician from all 'Other Engineering Technicians' the code would read

2165.299.01

this number to be assigned by the College Bibliocentre.

Codes attached

a. CCDO. (already distributed - available in CB Catalogue Code Manual.)

b. Type of training offered by the program

Code 1st digit

a. University or College diploma or certificated program - (post secondary);
b. vocational training - (retraining):
c. apprenticeship;
d. in-plant training;
e. on the job training;
f. pre-employment - (programs leading to academic upgrading or credit towards apprenticeship);
g. refresher;
h. professional development - (includes management development program);
j. extension programs - (non-career orientated, emphasis on profitable leisure).

Code 2nd digit

s. standard lecture program;
p. personalized instruction.

c. Length of Course in college duration.

Code

00 up to 6 days
01 7-13 days
02 14-20 days etc.

d. College/Campus Codes.

11-1	ALGONQUIN	Woodroffe Campus, Ottawa.
11-3	"	Rideau Campus, Ottawa.
11-4	"	Upper Ottawa Valley Campus, Pembroke.
12-1	ST. LAWRENCE	Kingston Campus, Kingston.
12-2	"	Cornwall Campus, Cornwall.
12-3	"	Brockville Campus, Brockville.
13-1	SIR SANDFORD FLEMING	Main Campus, Peterborough.
13-2	"	Russell Street East, Lindsay.
13-3	"	Brealey Campus, Peterborough.
13-4	"	Cobourg Campus, Cobourg.
13-6	LOYALIST	Main Campus, Belleville.
14-1	DURHAM	Main Campus, Oshawa.
15-1	CENTENNIAL	Warden Avenue, Scarborough.
15-2	"	Ashtonbee Campus, Scarborough.
16-1	HUMBER	Main Campus, Rexdale.
17-1	SENECA	Sheppard Campus, Willowdale.
17-2	"	Main Campus, Willowdale.
17-3	"	King Campus, King City

c. type of training

To differentiate the type of training for Industrial Instrumentation Technician, there may be need to consider College Diploma course from In-House Training: from Refresher courses etc. and to distinguish personalized learning programs from standard lecture orientated programs.

A College Diploma Course for an Industrial Instrumentation Technician in a standard lecture program would be

2165.299.01	as

d. length of course

A two-digit code would signify the number of days in weeks for the course. Thus, the average 2 year diploma course would be 66 weeks, a three year program 99.

The Industrial Instrumentation Technician Diploma Course would now read:

2165.299.01	as	66

e. course language code

A 3-digit code which identifies language of program.

Fre = French
Eng = English

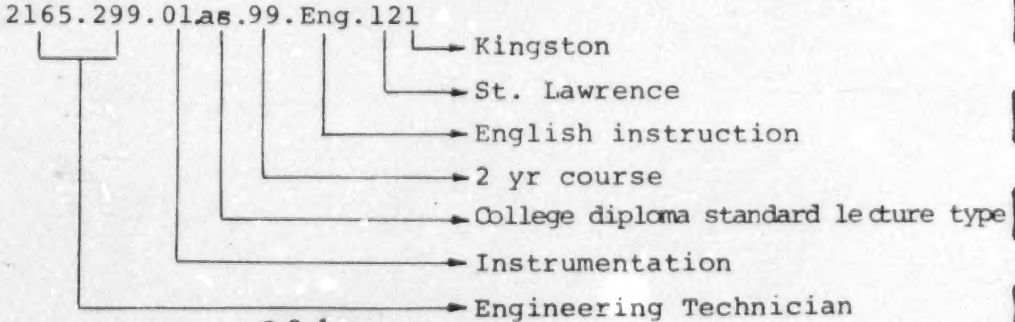
Thus, a two year program for Industrial Instrumentation Technician Diploma instructed in English, would read

2165.299.01	as	66	Eng

f. College/Campus identity

A 3-digit code which identifies the College offering the course.

Thus, an Industrial Instrumentation Technician Diploma Course instructed in English at St. Lawrence, Kingston Campus, would read



18-1	SHERIDAN	Brampton Campus, Brampton.
18-2	"	Main Campus, Oakville.
18-3	"	Lorne Park Campus, Port Credit.
18-4	"	Central Library, Oakville.
18-8	"	Applied Arts Library, Main Campus, Oakville.
19-1	MOHAWK	Main Campus, Hamilton.
19-3	"	Braneida Campus, Brantford.
19-5	"	Saltfleet Campus, Stoney Creek.
20-1	NIAGARA	Main Campus, Welland.
20-2	"	Adult Learning Centre, St. Catherines.
21-1	FANSHAWE	Main Campus, London.
21-2	"	Woodstock Agricultural Div., Woodstock.
21-3	"	Simcoe Agricultural Div., London.
21-4	"	Adult Education Centre, London.
21-5	"	St. Thomas Adult Education Centre, London.
22-1	ST. CLAIR	Main Campus, Windsor.
23-1	LAMBTON	Main Campus, Sarnia.
24-1	CONESTOGA	Main Campus, Kitchener.
24-2	"	Kitchener-Waterloo Continuing Ed. Centre, Waterloo.
24-3	"	Guelph Campus, Guelph.
25-1	GEORGIAN	Main Campus, Barrie.
25-2	"	Orillia Campus, The Armouries, Orillia.
25-3	"	Owen Sound Campus, Owen Sound.
26-1	CAMBRIAN	Main Campus, Sudbury.
27-1	NORTHERN	Main Campus, South Porcupine.
27-2	"	Kirkland Lake Campus, Kirkland Lake.
27-3	"	Haileybury Campus, Haileybury.
27-4	"	Retraining Division, Timmins.
28-1	CONFEDERATION	Main Campus, Thunder Bay.
28-2	"	Kenora Campus, Kenora.
28-3	"	Dryden Public Library, Dryden.
28-4	"	Audio Visual Department, Thunder Bay.
29-1	GEORGE BROWN	Kensington Campus, Toronto.
29-2	"	Casa Loma Campus, Toronto.
29-3	"	Terauley Campus, Toronto.
29-4	"	College Street Campus, Toronto.
29-5	"	MacPherson Campus, Toronto.
29-6	"	Keele Street Campus, Toronto.
30-1	RYERSON POLYTECHNICAL INSTITUTE	Main Campus, Toronto.
31-1	CANADORE	North Bay Campus, North Bay.
31-2	"	Audio Visual Dept., North Bay.
32-1	SAULT COLLEGE	Sault Ste. Marie Campus, Sault Ste. Marie.

Other imaginary examples

1. Industrial Maintenance Mechanic, 6 week program, in-plant, lectures offered at Sheridan, Brampton Campus, with instruction in English.

major and minor divisions

87 - Construction trades occupation
8799 - " " " other occupations

unit subdivision

8799.126 - Maintenance man, factory or mill.
[Note: this occupation indicates 2-4 yrs training and General Educational Development level of 4.]

In this case job description is sufficient, so no further subdivision is required. Thus, actual code number becomes

8799.126.00

type of course

8799.126.00.ds. Industrial Maintenance Mechanic in-plant training, lecture orientated

duration of course

8799.126.00.ds.06 Industrial Maintenance Mechanic in-plant training, lecture orientated for 6 weeks

language

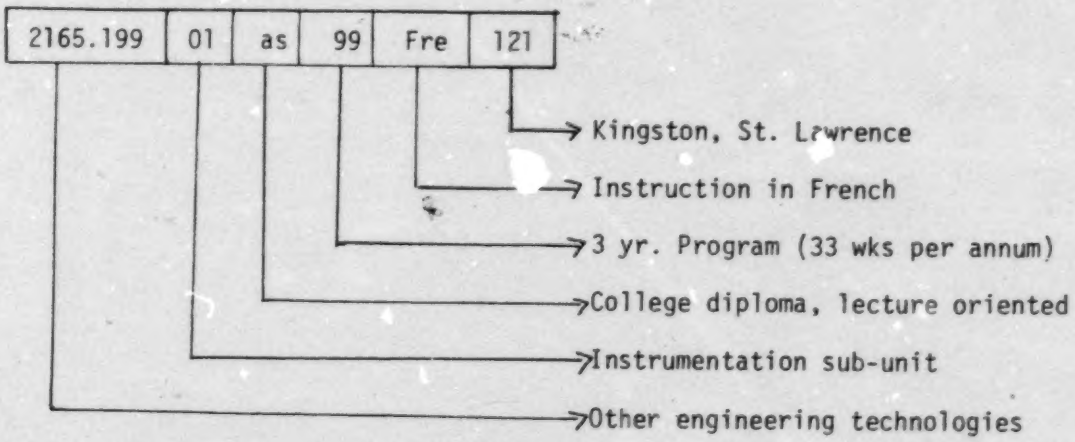
8799.126.00.ds.06.Eng. Industrial Maintenance Mechanic in-plant training, lecture orientated for 6 weeks with instruction in English

place

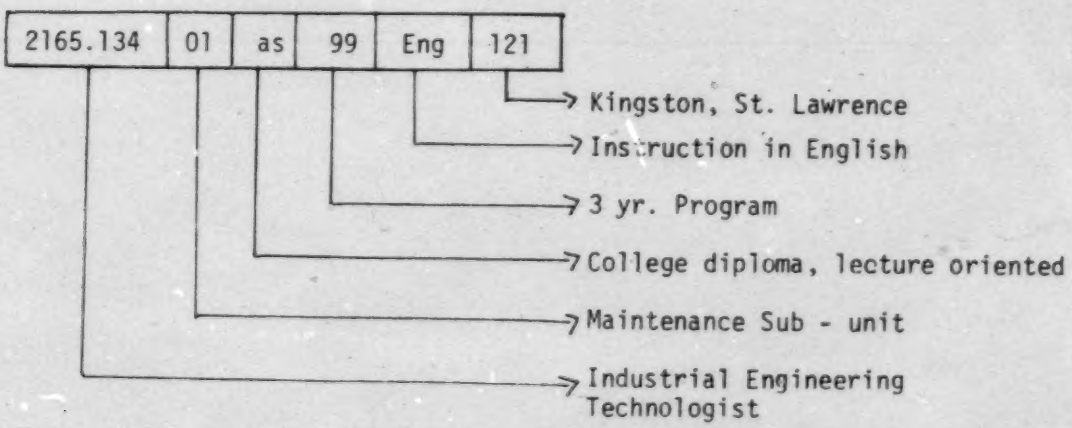
8799.126	00	ds	06	Eng	181

Industrial Maintenance Mechanic in-plant training, lecture orientated, for 6 weeks with instruction in English at Brampton Campus, Sheridan.

2. Industrial Instrumentation Technology, 3 Yr. program at Kingston, St. Lawrence with instruction in French, lecture oriented.



3. Industrial Engineering Technology (Maintenance), 3 yr. program at Kingston, St. Lawrence, with instruction in English, lecture oriented.



EPILOGUE - PART B

Comments on the first edition made by Robert E. Adams - author of the original DACUM document - DACUM Approach to Curriculum Learning and Evaluation in Occupational Training - Nova Scotia New Start, March 1974.

These comments have been summarized from an audio-tape made by Mr. Adams.

-The subheading 'Terminal Performance Objective' (TPO) which appears on each summary card in Part IV may be misleading - the term 'General Areas of Competence' may be more accurate. The definitions in each block on the chart are actually TPO's.

-Adams agrees with the 3 classifications of charts, i.e.:

a) the charting of courses as originally started by Dr. Rice, Howard Clement and Mr. Franklin.

b) the Nova Scotia New Start model for skill profile building and the use of rating scales.

c) offshoots of these two techniques

He suggests that there is perhaps too much flexibility within the approaches and that ultimately it is primarily industry and commerce which should determine the chart rather than a single developer.

-Within the Nova Scotia model there is no need or requirement for the use of modules as developed by the Ontario Manpower Training Branch or for the banking of objectives. The uniqueness of each chart precludes these uses and processes.

Author's Comment - This statement applies if the entire Nova Scotia model is being used - the whole idea of DACUM is evolving and new applications are being tried - perhaps there is room for Modules - banking of generic skills and the futher development of these skills by DACUM-like committees and groups.

-most curriculum activities in the experience of this author are compromises of some sort which can lead to new innovations and to getting the job done.

-Adams points out that DACUM as he uses it involves all of the processes of analysis, charting, program planning, rating, resource selection, sequencing and a learning posture - if the word DACUM implies all of these activities then the flow charts on pages 9 and 10 of the Introduction should indicate which processes or functions are implied - perhaps the term DACUM ANALYSIS would fit in better.

-He disagrees with the approach which calls for operationalizing the chart in a second step. If the committee meets for 3 (rather than 2) days, the level of detail should be such that further objectives need not be extruded. The built in rating scale provides sufficient flexibility to instructors in that it provides the performance objectives of the course.

Author's Comment - What was intended in this paper was a description of what is actually happening - the steps and procedures as outlined are not intended to be prescriptive.
However - Bob Adam's point is well taken.

As a follow-up to the comments on implementing the chart, he has outlined a very interesting technique. It involves the use of a Program Development Grid.

Essentially, a 1 or 2 day workshop is held with trainers, instructors, job experts and a coordinator. Large sheets are put up around the room - the skills are listed across the top and in columns under each skill the team contributes development information.

The following list is suggested by Mr. Adams:

- learning activities
- location
- occupational equipment
- occupational tools
- occupational supplies
- human resources
- selected printed materials
- printed material to be developed
- selected A.V. materials
- A.V. materials to be developed
- learning equipment

This information is then used by the developer(s) to operationalize the course.

-In Part III, regarding the actual steps in the analysis and charting process, it is suggested that a review of the occupation may have a narrowing rather than a broadening influence on the committee. Perhaps it would be better to expand the notion of the job then narrow it down.

In attempting the first band of skills, rather than starting with something simple like hand tools, it may be better to choose a General Area of Competence which is at the core of the occupation - this serves as a training and familiarization exercise for the committee.

When a band appears to be finished - an extra 15 minutes pushing for more skills often stimulates additional definitions which are significant.

-In Adam's experience many cards are dropped in the course of the analysis - the committee should be encouraged to define as wide a range of skills as possible and then to select and sort these through further discussion.

-He does not permit the committee to weigh skills - this is taken care of by the rating scale which is understood - individual firms in business and industry can quickly do a rating on a chart to indicate their emphasis for training purposes.

-He does not combine charts when a firm asks for training in more than one area - a man can work on more than one chart at a time without difficulty.

With respect to the Disadvantages listed on page 1 of Part 5:

1) he agrees.
2) this is not a disadvantage if the chart is to be used locally.
3) this only true if the coordinator permits it.
4) he disagrees as pointed out previously - if the analysis is extensive enough in the first place it should not be necessary to write additional objectives.
5) he does not see this as a disadvantage.
6) he often asks instructors who are hesitant about the use of charts to do a rating and finds that they begin to see the value of the chart.
7) he agrees that DACUM is not intended for non-competency courses - it was designed specifically for vocational and occupational training.

Author's Comment -

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It would serve no real purpose in terms of this document to promote 'THE GREAT DEBATE' on the relative merits and fine points of the various uses and understandings of DACUM.

What is of interest is the growing refinement and unfolding of processes that are meeting the needs of contemporary curriculum developers. The growing collection and use of DACUM charts for purposes of communication and the interchange of information with respect to standards will hopefully assist educators, trainers and developers to meet their goals.

DACUM COORDINATOR'S KIT

DESIGNED FOR: Occupational Analysts, Vocational Curriculum Developers, Company Training Officers

TO ASSIST THEM: in preparing competency models or skill profiles of occupations (DACUM charts)

TO BE USED FOR: Rating and qualifying employees, evaluating, recording and reporting learner progress, organizing informal on the job training, planning and organizing institutional or group training.

CONTENTS:
14 audio taped presentations
15 copies of DACUM ILLUSTRATIONS, a booklet of visuals to accompany the tapes
15 copies of a booklet of visuals for Program Planning committees
sample of PD grid section
instructions for animating illustrations for tape #1
instructions on using the kit
workshop and tape schedule
cassette album

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PROGRAM PLANNING WORKSHOP: How Learning Takes Place, How the Program is Developed, How to Complete the Grid

The DACUM Coordinators Kit is used to orient DACUM committee menbers and provide instructions for each step of chart building. It reduces the work load of the coordinator, reduces his training time, and provides more consistent and better quality charts.

The Kit was designed by Robert E. Adams who developed the Nova Scotia Newstart version of DACUM, now used by a number of training institutions, as well as by government, and private organizations for job analysis and employee training. The Kit was developed, tested in several DACUM workshops, and refined over 2 1/2 years, and is based on 7 years experience in producing charts and training other coordinators.

Included is a 3 part presentation for leading a program planning committee in completing a Program Development Grid, a new technique that involves instructors and industry in overall planning of DACUM training.

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APPENDIX "A":

(1) Example of Chart produced by method in Part III (author's technique as used in Ontario).

(2) Example of British Columbia Chart.

(3) Example of Nova Scotia Newstart Corp. Chart.

(4) Blank Chart.

APPENDIX "B": Task Certification Record for Biomedical Equipment Technician (Entry Level).

APPENDIX "C": Learning-Evaluation Model for Trainee using DACUM Process - Nova Scotia Newstart Corp.

APPENDIX "D": STEP Learning Process - Holland College, Prince Edward Island.

APPENDIX "E": Diagram of furniture arrangement for DACUM session.

STUDENT PROGRAM CHART

INTERMEDIATE PERFORMANCE OBJECTIVES

		Operate cut-off saws 001.001		Operate a drill press 001.002
Select & use: Calipers(Vernier) Micrometers, protractors, dial gauges 003.001	Select & use marking & scribing tools 003.002	Select & use gauges, thread, jo block, gap,depth height, torque 003.003	Select & use flatness testor profile projector 003.004	Use hardness testors 003.005
	Solve problems in basic Algebra and Trigonometry 004.001		Apply basic mathematical formulas 004.002	Make calculations related to: force flow, pressure, speed 004.003
			Inspect incoming components 005.001	Sequence the steps of assembly 005.002
		Examine instrument and determine problem 006.001	Report findings for approval 006.002	Disassemble mechanical, optical, elec. instruments 006.003
Interpret symbols conventions, abbreviations used in drawings 007.001		Relate symbols to proper field of technology 007.002	Read mechanical schematics 007.003	

STUDENT PROGRAM CHART

INTERMEDIATE PERFORMANCE OBJECTIVES

Select and sharpen machine cutting tools 001.003	Operate a tool maker's lathe 001.004	Operate a milling machine: vertical and horizontal 001.005	Operate a 2 & 3 dimensional pantograph 001.006	Operate Jewellers lathe 001.007
	Select and use Vices 002.001	Select and use Files 002.002	Select & use cutting tools, cutoffs, diamon,, hacksaws 002.003	Select & use: screwdrivers, wrenches, torque wrenches 002.004
	Use Arbour Presses 002.008	Select and use soft and hard soldering eqmt. 002.009	Select and use power-hand tools 002.010	Select and use polishing stone, compounds 002.011
Select & use timing devices eg. stop watch, electrical counters, profile recorder 003.006	Use a tachometer 003.007	Select & use collimaters, centering devices, tool maker's microscope 003.008	Use temperature and pressure gauges 003.009	Select & use electrical meters, voltmeter ohmmeter ammeter, multimeter 003.010
			Interpret current standards & codes 004.004	Research technical data required 004.005
Use specified test equipment 005.003	Fabricate special jigs & testing apparatus 005.004	Check subassemblies against special codes, eg. Fed. CSA Military 005.005	Test function & or accuracy of sub-assemblies 005.006	Isolate faults 005.007
Inspect, clean, repair or replace parts, mechanical optical, optical, elec. instrumen's 006.004	Reassemble mechanical, optical, electrical instruments 006.005	Use appropriate lubricants 006.006	Calibrate & test mechanical, optical electrical instruments 006.007	Maintain Calibration Chart 006.008
			Read wiring diagrams 007.004	Read electrical & electronic schematics 007.005
	Identify & select metals, ferrous, non-ferrous 008.001	Identify & select plastics, rubber, insulating material 008.002	Select and use adhesives 008.003	Select and use lubricants 008.004
Adapt technical terminology 009.001	Write memos 009.002	Write technical reports and service records 009.003	File and classify technical data 009.004	Use microfilm systems 009.005

STUDENT PROGRAM CHART

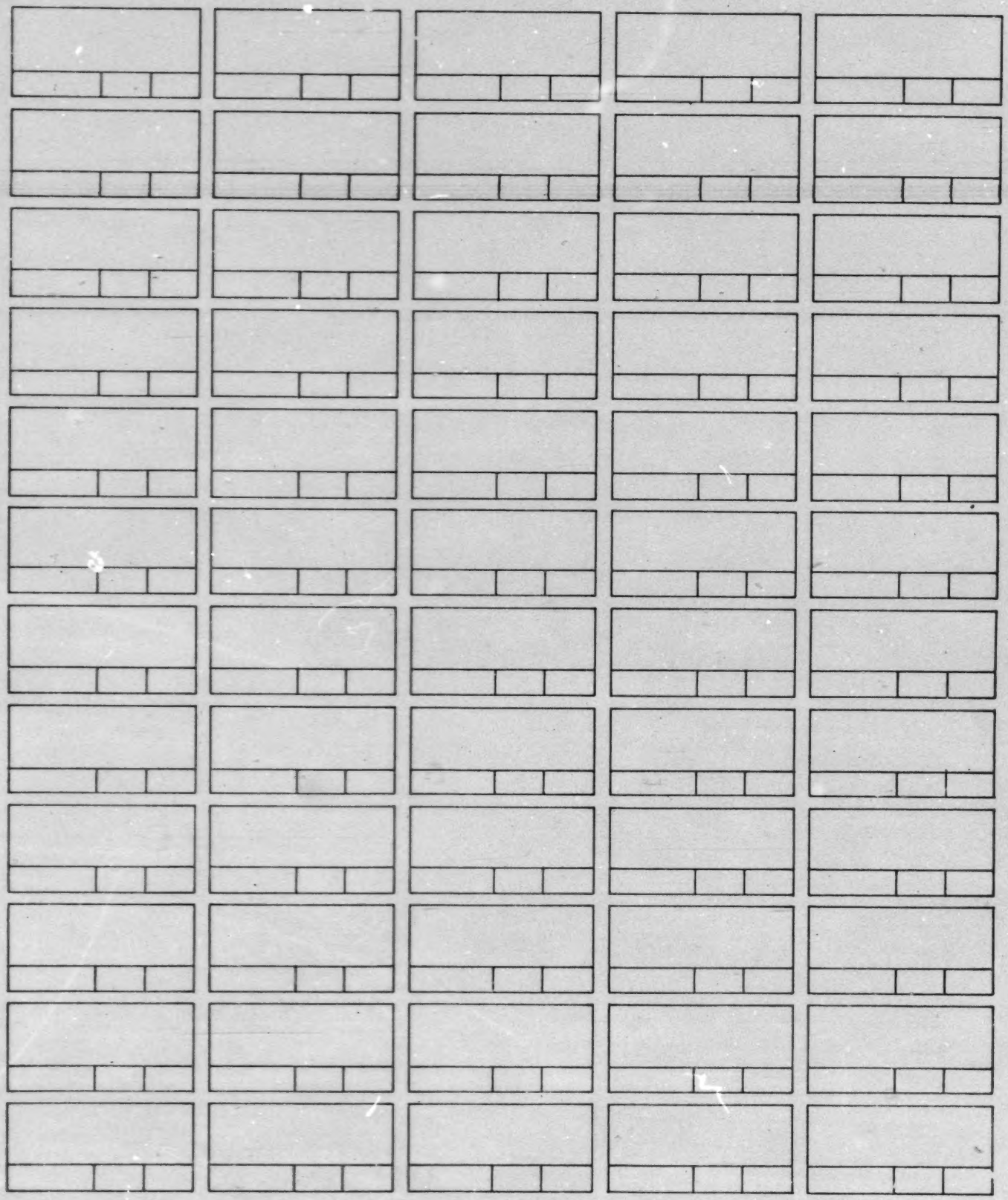
INTERMEDIATE PERFORMANCE OBJECTIVES			TERMINAL PERFORMANCE OBJECTIVES
Draw simple sketches of required parts 001.008	Design simple jigs and fixtures 001.009		OPERATE AND MAINTAIN MACHINE TOOLS 001
Select & use: taps, dies, drills, reamers 002.005	Select and use pliers & tweezers 002.006	Select and use fasteners 002.007	SELECT, USE AND MAINTAIN HAND TOOLS 002
Apply lapping techniques 002.012	Apply heat treatment tech. to metals, tempering, hard., anhealing 002.013	Select, use and make special tools & parts 002.014	
Select and use chart recorders 003.011	Select & use oscilloscopes, signal generators, pulse generator 003.012	Select & use dialectric strength meters, insulation resist. testers 003.013	USE MEASURING EQUIPMENT 003 MECHANICAL OPTICAL ELECTRICAL
Draw simple sketches using drafting principles 004.006	Estimate time & material for design & advantages of design 004.007		DESIGN ASSEMBLY AND TESTING DEVICES 004
Apply appropriate finishing techniques 005.008	Do final check to verify instrument function 005.009	Inspect final pr product for consumer acceptability 005.010	ASSEMBLE INSTRUMENTS 005 MECHANICAL OPTICAL ELECTRICAL
Order spare parts to maintain stock 006.009	Follow a maintenance program 006.010	Recommend changes in maintenance according to conditions 006.011	REPAIR, ADJUST AND MAINTAIN INSTRUMENTS 006
			READ AND INTERPRET BLUEPRINTS AND SCHEMATICS 007
Identify, select & apply material coatings: paint, powder, anhodizing 008.005	Identify electronic components 008.006	Identify & select electrical components and wire 008.007	IDENTIFY AND SELECT MATERIALS AND COMPONENTS 008
	Instruct technicians, operators users in use of equipment 009.006	Practice human relations skills & bus. ethics 009.007	COMMUNICATE EFFECTIVELY 009

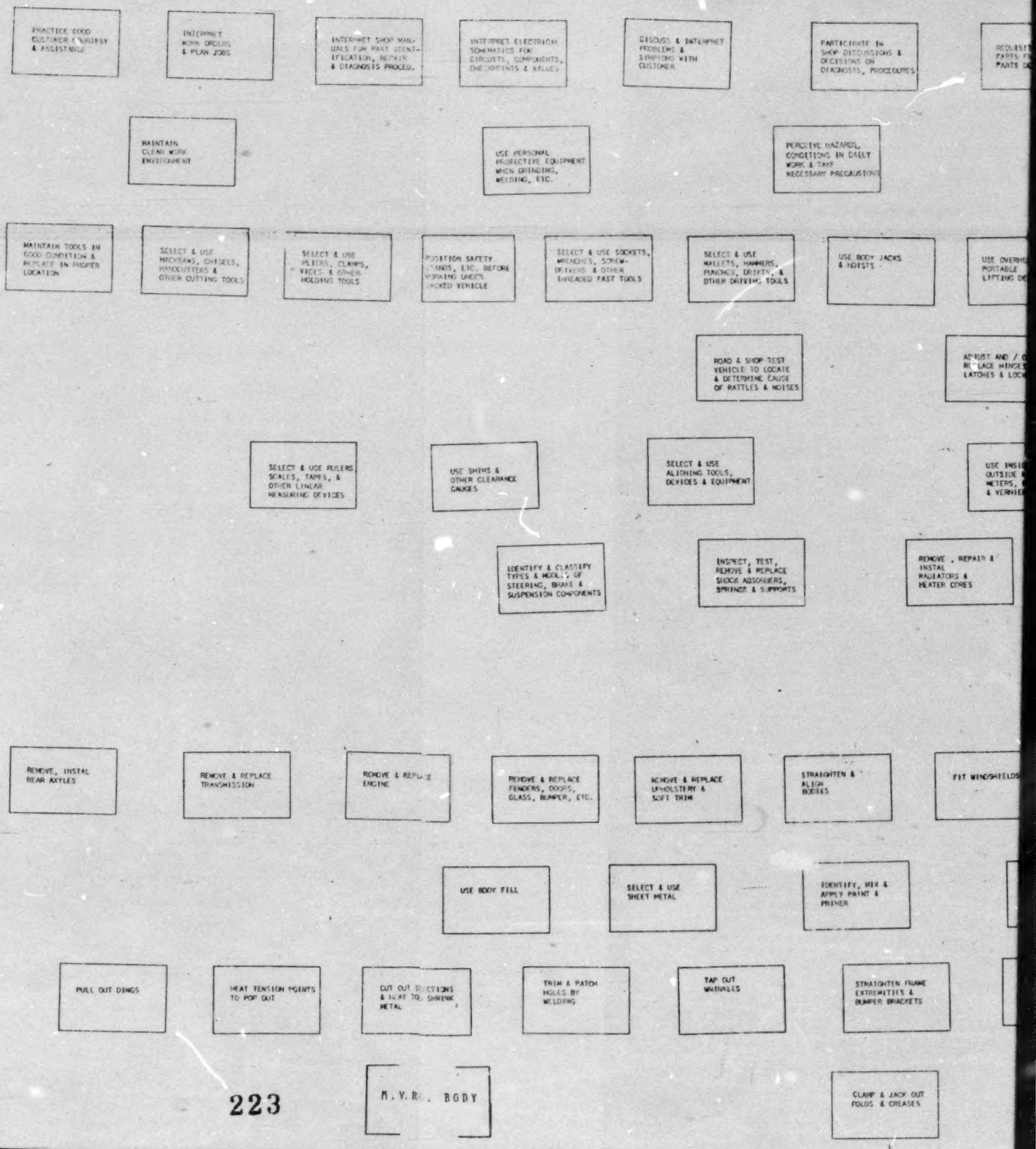
STUDENT PROGRAM CHART

INTERMEDIATE PERFORMANCE OBJECTIVES			TERMINAL PERFORMANCE OBJECTIVES

STUDENT PROGRAM CHART

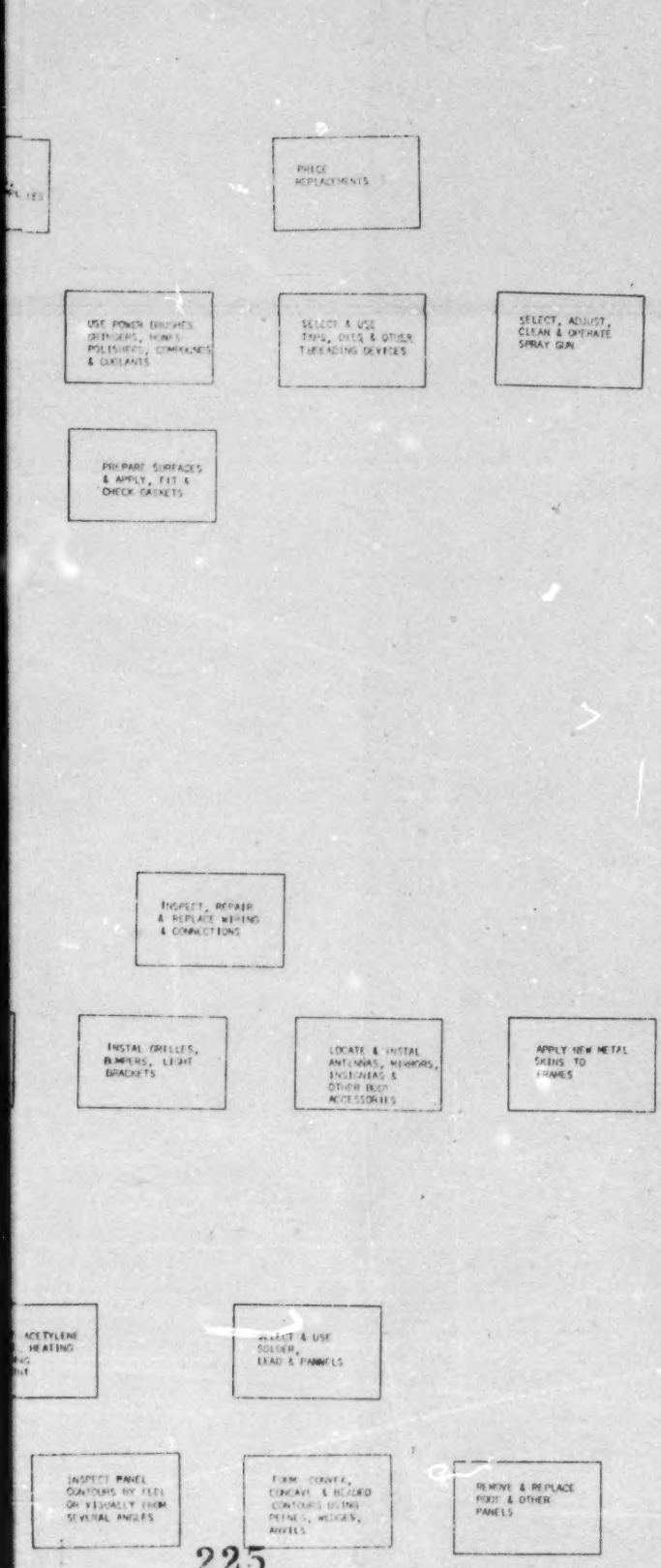
INTERMEDIATE PERFORMANCE OBJECTIVES




PRACTICE GOOD CUSTOMER COURTESY & ASSISTANCE
INTERPRET WORK ORDERS & PLAN JOBS
INTERPRET SHOP MANUALS FOR PART IDENTIFICATION, REPAIR & DIAGNOSIS PROCED.
INTERPRET ELECTRICAL SCHEMATICS FOR CIRCUITS, COMPONENTS, CHECKPOINTS & VALUES
DISCUSS & INTERPRET PROBLEMS & SYMPTOMS WITH CUSTOMER
PARTICIPATE IN SHOP DISCUSSIONS & DECISIONS ON DIAGNOSIS, PROCEDURES
MAINTAIN CLEAN WORK ENVIRONMENT
USE PERSONAL PROTECTIVE EQUIPMENT WHEN GRINDING, WELDING, ETC.
PERCEIVE HAZARDS, CONDITIONS IN DAILY WORK & TAKE NECESSARY PRECAUTIONS
MAINTAIN TOOLS IN GOOD CONDITION & REPLACE IN PROPER LOCATION
SELECT & USE HACKSAWS, CHISELS, HANDCUTTERS & OTHER CUTTING TOOLS
SELECT & USE PLIERS, CLAMPS, VICES & OTHER HOLDING TOOLS
POSITION SAFETY STANDS, ETC. BEFORE WORKING UNDER JACKED VEHICLE
SELECT & USE SOCKETS, WRENCHES, SCREW-DRIVERS & OTHER THREADED FAST TOOLS
SELECT & USE MALLETS, HAMMERS, PUNCHES, DRIFTS, & OTHER DRIVING TOOLS
USE BODY JACKS & HOISTS
ROAD & SHOP TEST VEHICLE TO LOCATE & DETERMINE CAUSE OF RATTLES & NOISES
SELECT & USE RULERS SCALES, TAPES, & OTHER LINEAR MEASURING DEVICES
USE SHIMS & OTHER CLEARANCE GAUGES
SELECT & USE ALIGNING TOOLS, DEVICES & EQUIPMENT
IDENTIFY & CLASSIFY TYPES & MODELS OF STEERING, BRAKE & SUSPENSION COMPONENTS
INSPECT, TEST, REMOVE & REPLACE SHOCK ABSORBERS, SPRINGS & SUPPORTS
REMOVE , REPAIR & INSTAL RADIATORS & HEATER CORES
REMOVE, INSTAL REAR AXLES
REMOVE & REPLACE TRANSMISSION
REMOVE & REPLACE ENGINE
REMOVE & REPLACE FENDERS, DOORS, GLASS, BUMPER, ETC.
REMOVE & REPLACE UPHOLSTERY & SOFT TRIM
STRAIGHTEN & ALIGN BODIES
USE BODY FILL
SELECT & USE SHEET METAL
IDENTIFY, MIX & APPLY PAINT & PRIMER
PULL OUT DINGS
HEAT TENSION POINTS TO POP OUT
CUT OUT SECTIONS & HEAT TO SHRINK METAL
TRIM & PATCH HOLES BY WELDING
TAP OUT WRINKLES
STRAIGHTEN FRAME EXTREMITIES & BUMPER BRACKETS
CLAMP & JACK OUT FOLDS & CREASES

REQUISITION PARTS FROM PARTS DEPARTMENT
REQUISITION SPECIALTY TOOLS FROM TOOL CRIB
INTERPRET MANUALS TO DETERMINE DIMENSIONS, CHECK POINTS & MEASUREMENT PROCEDURES
CONFIRM OR REPORT LIABILITY DAMAGE
ESTIMATE MATERIAL COST
ESTIMATE LABOUR COST
CARE FOR & MAINTAIN ELECTRICAL & MECHANICAL SHOP EQUIPMENT
LOCATE & OPERATE FIRE EXTINGUISHERS
APPLY EXHAUST TUBES & FANS PRIOR TO RUNNING ENGINES
USE BODY JACKS & HOISTS
USE OVERHEAD & PORTABLE LIFTING DEVICES
SELECT & USE TWIST DRILLS, REAMERS, BORING TOOLS & COOLANTS
SELECT & OPERATE PORTABLE & BENCH POWER TOOLS
SELECT & USE ABRASIVE & WIRE WHEELS & BUFFERS
CUT METAL WITH PNEUMATIC PANEL CUTTER
SELECT & USE PICK, PEEN, UPHOLSTERY, SLEDGE & SOFT FACED HAMMERS
ADJUST AND / OR REPLACE HINGES, LATCHES & LOCKS
LOCATE, CHECK, & ADJUST BODY & COMPONENT FASTENERS
DISCONNECT, ADJUST & CONNECT SWITCHES, LINKAGES, SPRINGS & MECHANICAL CONTROLS
DISCONNECT RECONNECT & ADJUST CONTROL LINKAGES
USE INSIDE & OUTSIDE MICROMETERS, CALIPERS & VERNIERS
REMOVE , REPAIR & INSTAL RADIATORS & HEATER CORES
INSPECT, REMOVE, REPLACE & ADJUST STEERING LINKAGE COMPONENTS
CLEAN, INSPECT REPLACE PARTS ADJUST & INSTAL STEERING BOX
TEST, ADJUST & REPLACE TORSION BARS
IDENTIFY & CLASSIFY TYPES & MODELS OF ELECTRICAL SYSTEM COMPONENTS
CHECK & ADJUST HEADLIGHT ALIGNMENT
CHECK & REPLACE BULBS, FUSES LAMPS & GATES
FIT WINDSHIELDS
FIT WINDOWS
ADJUST WINDOW CRANK MECHANISMS
FIT DOORS, HOOD & TRUNK LID
INSTALL SEATS & BUMPERS
CONSTRUCT TEMPORARY FRAME & CONTOUR TEMPLATES
MEASURE WINDOWS & OTHER COMPONENTS & ADD TOLERANCE TO DETERMINE OPENING DIMENSIONS
INTERPRET MANUAL SPECIFICATIONS AND LAYOUT FRAME WORK OR SHEET METAL
STRAIGHTEN FRAME EXTREMITIES & BUMPER BRACKETS
STRAIGHTEN & ALIGN WINDOW OPENINGS
STRAIGHTEN & ALIGN ROOF & BODY PANEL FRAMING
REMOVE, STRAIGHTEN & ALIGN HOODS, LIDS & FLAPS
STRAIGHTEN & ALIGN DOORS & DOOR FRAMES
CLAMP & JACK OUT FOLDS & CREASES
INSPECT FOR RUST DAMAGE & CUT OUT CORRODED PARTS
PREPARE SURFACE FOR FILLING
PREPARE BODY FILL SELECT LEAD
APPLY BODY FILL OR LEAD & CURE
SELECT FILE & ROUGH CONTOUR SURFACE

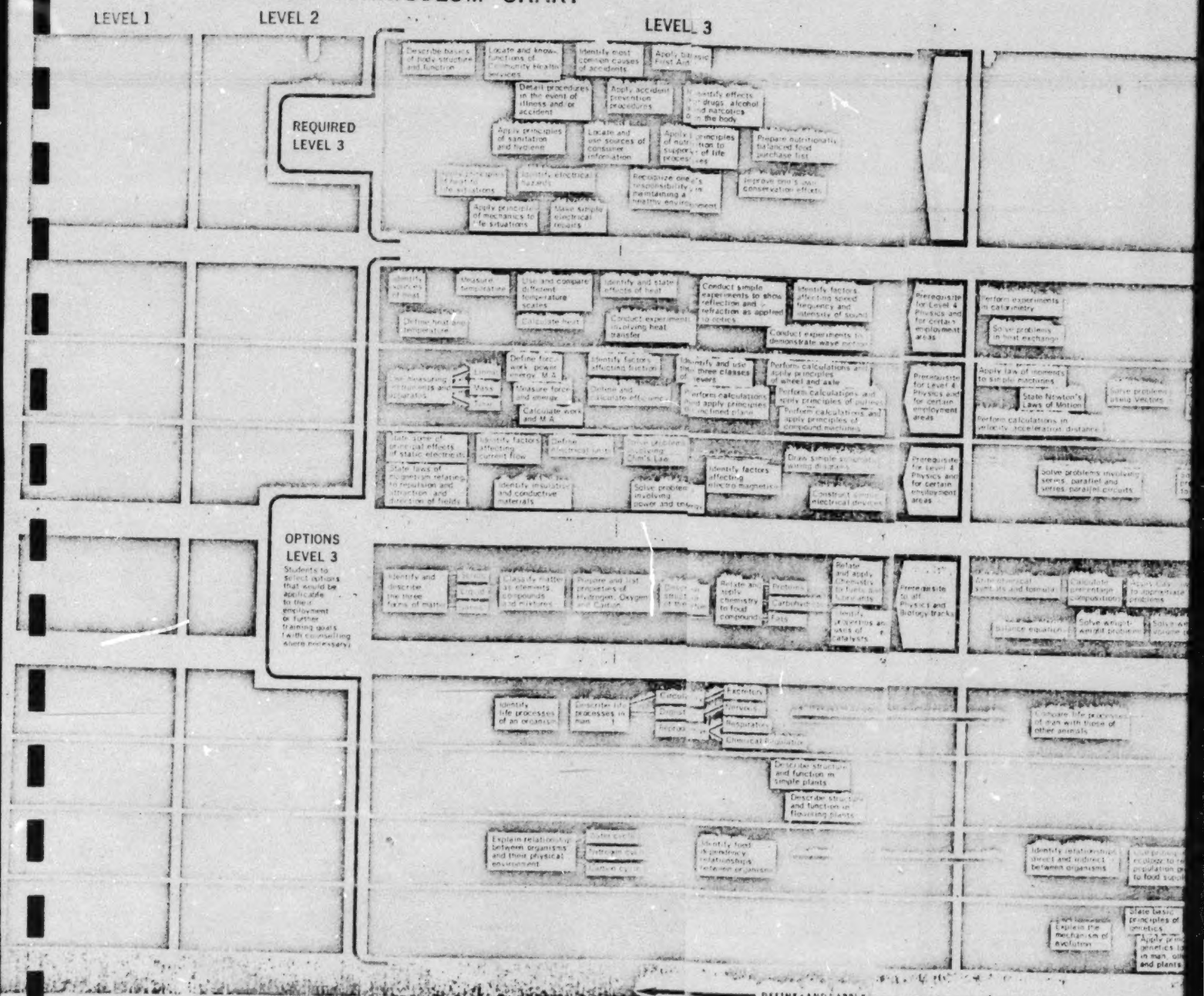
ESTIMATE MATERIAL COST
ESTIMATE LABOUR COST
CONSULT FLAT RATE MANUALS
COMMUNICATE IN WORK E
APPLY EXHAUST TUBES & FANS PRIOR TO RUNNING ENGINES
SELECT & USE CLEANING FLUIDS, EQUIPMENT & SUPPLIES
PRICE REPLACEMENTS
PERFORM 6S SHOP DUTIES
SELECT & USE PICK, PEEN, UPHOLSTERY, SLEDGE & SOFT FACED HAMMERS
SELECT, MAINTAIN & USE BODY FISHE, ROUND & FLAT FILES
USE TORQUING DEVICES
USE POWER BRUSHES GRINDERS, HONES POLISHERS, COMPOUNDS & COOLANTS
SELECT & USE TAPS, DIES & OTHER THREADING DEVICES
SELECT, ADJUST, CLEAN & OPERATE SPRAY GUN
USE REPAIR & EQUIPMEN
DISCONNECT RECONNECT & ADJUST CONTROL LINKAGES
IDENTIFY GASKET MATERIALS, CEMENTS & SOLVENTS & REMOVE GASKETS
PREPARE SURFACES & APPLY, FIT & CHECK GASKETS
ADJUST & RE MECHANICAL & CONTROLS
USE MEASUR TESTING DE
TEST, ADJUST & REPLACE TORSION BARS
SERVICE & RE STEERING, SU & BRAKE SYST COOLING SYS
CHECK & REPLACE BULBS, FUSES LAMPS & GATES
REMOVE; INSPECT & INSTAL AUTOMOBILE INSTRUMENTS
INSPECT, REPAIR & REPLACE WIRING & CONNECTIONS
SERVICE & RE ELECTRICAL
INSTALL SEATS & BUMPERS
FIT & INSTAL FENDERS
INSTAL TRIM
INSTAL GRILLES, BUMPERS, LIGHT BRACKETS
LOCATE & INSTAL ANTENNAS, MIRRORS, INSIGNIAS & OTHER BODY ACCESSORIES
APPLY NEW METAL SKINS TO FRAMES
REMOVE & RE COMPONENTS OF AUTOMOB
SELECT, USE MATERIALS, & PAINT
STRAIGHTEN & ALIGN DOORS & DOOR FRAMES
STRAIGHTEN & ALIGN FENDERS
USE OXY ACETYLENE CUTTING HEATING & WELDING EQUIPMENT
SELECT & USE SOLDER, LEAD & PANELS
STRAIGHTEN FRAMEWORK
APPLY BODY FILL OR LEAD & CURE
SELECT FILE & ROUGH CONTOUR SURFACE
SAND FILLED SURFACE
INSPECT PANEL CONTOURS BY FEEL OR VISUALLY FROM SEVERAL ANGLES
FORM CONVEX, CONCAVE & BEADED CONTOURS USING PEENES, WEDGES, ANVILS
REMOVE & REPLACE ROOF & OTHER PANELS
SHAPE BO CONTOURS


COMMUNICATE EFFECTIVELY IN WORK ENVIRONMENT
PERFORM GENERAL SHOP DUTIES
USE REPAIR TOOLS & EQUIPMENT
ADJUST & REPLACE MECHANICAL EQUIPMENT & CONTROLS
USE MEASURING & TESTING DEVICES
SERVICE & REPAIR STEERING, SUSPENSION & BRAKE SYSTEMS & COOLING SYSTEMS
SERVICE & REPAIR ELECTRICAL SYSTEMS
REMOVE & REPLACE COMPONENTS PARTS OF AUTOMOBILE
SELECT, USE MATERIALS, PRIME & PAINT
STRAIGHTEN & ALIGN FRAMEWORK
SHAPE BODY CONTOURS
PRICE REPLACEMENTS
USE POWER BRUSHES GRINDERS, HONES POLISHERS, COMPOUNDS & COOLANTS
SELECT & USE TAPS, DIES & OTHER THREADING DEVICES
SELECT, ADJUST, CLEAN & OPERATE SPRAY GUN
PREPARE SURFACES & APPLY, FIT & CHECK GASKETS
INSPECT, REPAIR & REPLACE WIRING & CONNECTIONS
INSTAL GRILLES, BUMPERS, LIGHT BRACKETS
LOCATE & INSTAL ANTENNAS, MIRRORS, INSIGNIAS & OTHER BODY ACCESSORIES
APPLY NEW METAL SKINS TO FRAMES
ACETYLENE HEATING
SELECT & USE SOLDER, LEAD & PANELS
INSPECT PANEL CONTOURS BY FEEL OR VISUALLY FROM SEVERAL ANGLES
FORM COVEX, CONCAVE & BEADED CONTOURS USING PEENES, HEDGES, ANVILS
REMOVE & REPLACE ROOF & OTHER PANELS

Can perform this task with more than acceptable speed and quality, with initiative and adaptibility and can lead others in performing this task.	6
Can perform this task with more than acceptable speed and quality and with initiative and adaptibility to special problem situations.	5
Can perform this task satisfactorily without supervision or assistance with more than acceptable speed and quality of work.	4
Can perform this task satisfactorily without assistance and/or supervision.	3
Can perform this task satisfactorily but requires periodic supervision and/or assistance.	2
Can perform this task, but not without constant supervision and some assistance.	1
Cannot perform this task satisfactorily for participation in a work environment.	0

MOTOR VEHICLE REPAIR (BODY)

BASIC TRAINING FOR SKILL DEVELOPMENT
SCIENCE CURRICULUM CHART


LEVEL 1
LEVEL 2
LEVEL 3
REQUIRED LEVEL 3
OPTIONS LEVEL 3
Students to select options that would be applicable to their employment or further training goals (with counselling where necessary)
Describe the basics of body structure and function
Locate and know functions of community Health services
Identify most common causes of accidents
Apply basic First Aid
Detail procedures in the event of illness and or accident
Apply accident prevention procedures
Identify effects of drugs alcohol and narcotics in the body
Apply principles of sanitation and hygiene
Locate and use sources of consumer information
Prepare nutritionally balanced food purchase list
Identify electrical hazards
Recognize one's responsibility in maintaining a healthy environment
Improve one's own conservation efforts
Apply principle of mechanics to life situations
State simple electrical repairs
Measure temperature
Use and compare different temperature scales
Identify and state effects of heat
Conduct simple experiments to show reflection and refraction as applied to optics
Identify factors affecting speed frequency and intensity of sound
Define heat and temperature
Calculate heat
Conduct experiments involving heat transfer
Conduct experiments to demonstrate wave motion
Prerequisite for Level 4 Physics and for certain employment areas
Perform experiments in calorimetry
Solve problems in heat exchange
Define force work power energy M A
Identify factors affecting friction
Identify and use three classes of levers
Perform calculations and apply principles of wheel and axle
Apply IA of moments to simple machines
State Newton's Laws of Motion
Solve problems using Vectors
Measure force and energy
Define and calculate efficiency
Perform calculations and apply principles of inclined planes
Perform calculations and apply principles of compound machines
Prerequisite for Level 4 Physics and for certain employment areas
Perform calculations in velocity acceleration distance
State some of principal effects of static electricity
Identify factors affecting current flow
Define electrical units
Solve problems involving Ohm's Law
Identify factors affecting electro magnetism
Draw simple wiring diagrams
Construct simple electrical devices
Prerequisite for Level 4 Physics and for certain employment areas
Solve problems involving series parallel and series parallel circuits
State laws of magnetism relating to repulsion and attraction and direction of fields
Identify insulative and conductive materials
Solve problem involving power and energy
Identify and describe the three forms of matter
Classify matter as elements compounds and mixtures
Prepare and test properties of Hydrogen Oxygen and Carbon
Relate and apply chemistry to food compounds
Proteins
Carbohydrates
Fats
Identify functions and uses of catalysts
Prerequisite to all Physics and Biology tracks
Identify life processes of an organism
Describe life processes in man
Excretion
Circulation
Digestion
Respiration
Chemical Regulation
Compare life processes of man with those of other animals
Describe structure and function in simple plants
Describe structure and function in flowering plants
Explain relationship between organisms and their physical environment
Identify food dependency relationships between organisms
Identify relationships direct and indirect between organisms
Explain the mechanism of evolution
State basic principles of genetics
DEFINE AND APPLY SCIENTIFIC METHOD (INTEGRATED THROUGHOUT PROGR

Published by
Division of Technical and Vocational Services
CURRICULUM DEVELOPMENT BRANCH
Department of Education
Province of British Columbia

L 3

LEVEL 4

RELATE AND APPLY PRINCIPLES OF LIFE HEALTH AND PHYSICAL SCIENCE TO ONE'S ENVIRONMENT 1

GENERA SCIENC

CONDUCT EXPERIMENTS AND SOLVE PROBLEMS INVOLVING HEAT/ LIGHT/ SOUND 2

CONDUCT EXPERIMENTS AND SOLVE PROBLEMS INVOLVING APPLIED MECHANICS 3

PHYSICS

CONDUCT EXPERIMENTS AND SOLVE PROBLEMS INVOLVING MAGNETISM AND ELECTRICITY 4

CONDUCT EXPERIMENTS AND SOLVE PROBLEMS INVOLVING APPLIED CHEMISTRY 5

CHEMISTR

TO RELATE FUNCTION TO STRUCTURE IN ANIMALS WITH EMPHASIS ON MAN 6

TO RELATE FUNCTION TO STRUCTURE IN PLANTS 7

BIOLO

APPLY PRINCIPLES OF ECOLOGY TO MAN'S PLACE IN THE WORLD 8

APPLY PRINCIPLES OF GENETICS AND EVOLUTION 9

DEFINE AND APPLY SCIENTIFIC METHOD (INTEGRATED THROUGHOUT PROGRAM)

APPENDIX "B"

TASK CERTIFICATION RECORD

JOB FAMILY: Biomedical Equipment Technician and Related Occupations
EXIT LEVEL: Technician (Entry)

LMS

device components such as rotors, sample holders, motor brushes, motor bearings, drive couplings and shaft seals.

☐☐☐ 2416 Performance check clinical centrifuge and other small motor driven device components such as rotors, sample holders, motor brushes, motor bearings, drive couplings and shaft seals.

☐☐☐ 2417 Preventive maintenance of fractional horsepower electr motors from such apparatus as pumps, fraction collec centrifuges, shakers, electrical beds and surgical tables.

☐☐☐ 2418 Remove and replace fractional horsepower electrical motors from such apparatus as pumps, fraction collectors, centrifuges, shakers, electrical beds and surgical tables.

☐☐☐ 2419 Repair fractional horsepower electrical motors from such apparatus as pumps, fraction collectors, centrifuges, shakers, electrical beds and surgical tables.

☐☐☐ 2420 Preventive maintenance of equipment such as incubator ovens, heating elements, bacterial water baths, tissue water baths, and water and blood temperature regulators.

☐☐☐ 2501 Operates basic test equipment, such as high and low voltage power supplies, multimeters, oscilloscopes, tube and transistor testers and bridges.

☐☐☐ 2502 Measures parameters, such as voltage, current resistance, capacitance and inductance.

☐☐☐ 2503 Test diodes, vacuum tubes and transistors.

☐☐☐ 2504 Remove and replace standard electronic components from all types of single function equipment such as defibrillators and electrocardiographs.

☐☐☐ 2505 Assembles simple electrical, mechanical and optical sub-assemblies, such as photodetector circuits, indicators, single stage amplifiers and power supplies.

☐☐☐ 2506 Breadboards simple electrical, mechanical and optical systems.

☐☐☐ 2507 Troubleshoots simple circuits such as series and parallel resistive circuits as found in examining lamps, blowers, heaters, etc.

☐☐☐ 2508 Repairs simple circuits such as series and parallel resistive circuits as found in examining lamps, blowers, heaters, etc.

Name _____

Soc. Sec. No. _____ Date _____

Length of Training _____

Certified by _____
Director

School _____

Address _____

_____

102-009

TO THE EMPLOYER:

This occupational readiness record is an inventory of the educational training program and a measure of the level of proficiency attained in job tasks by the individual student. Each graduate can provide potential employers with more complete task certification lists which itemize in considerable detail, the skills and knowledge in which he has demonstrated proficiency. It is recognized that persons working at the specified technical level will function with direction and assistance from superiors. As a part of his training the graduate has learned to expect appropriate instruction and supervision with each assigned task. Furthermore, the graduate understands that he lacks the authority and training to perform certain functions and operations. He will expect and seek, supervision, assistance and direction where appropriate. Note that the job tasks as identified are basic to the next higher or more sophisticated job level. Work experience, training and further education may qualify the graduate for more complicated tasks, a new job title and higher pay.

KEY TO PROFICIENCY CODE:

vel L: Limited Skill–does simple parts of the task using required tools and instruments, but requires instruction and supervision to do most parts of the job. Identifies components by name, knows basic facts about the job.

Level M: Moderate Skill–requires assistance on some parts, but can use most tools and special equipment needed. Knows work procedures but may not meet minimum demands for speed and accuracy.

Level S: Skilled–understands operating principles and accomplishes all parts of the task with spot checks of the finished work, meets minimum demands for speed and accuracy.

A graduate receiving this document has satisfactorily demonstrated to the staff his ability to work safely, understand and carry out instructions, and cooperate with other employees. This document also attests to his punctuality, reliability and general work habits.

Technical Education Research Center

JOB FAMILY: Biomedical Equipment Technician and Related Occupations
EXIT LEVEL: Technician (Entry)

L M S

□□□ 2101 Selects, retrieves and returns to files manufacturers operating and repair service manuals.

□□□ 2102 Transports equipment to in-house repair facility accordi to established procedures.

□□□ 2103 Maintains log and records of each work assignment.

□□□ 2104 Communicates with and provides technical assistance to medical staff using standard medical terminology related to instrumentation and his work.

□□□ 2105 Reads and interprets instructional and maintenance manuals as well as blue prints, mechanical drawings, and schematic diagrams related to the equipment upon which he performs services.

□□□ 2106 Reads technical journals and literature related to the job field.

□□□ 2107 Participates in organized education and training activities to up-grade knowledge and job performance.

□□□ 2108 Returns malfunctioning equipment, in or out of warranty, that is not repairable within the facility to the manufacturer.

□□□ 2109 Cleans and/or lubricates mechanical instruments and devices associated with medical apparatus.

□□□ 2110 Initiates requests for replacement parts and materials.

□□□ 2201 Uses common hand tools as required in the performance of job tasks.

□□□ 2202 Operates fundamental machine tools such as hand drills, drill presses, bench grinder/buffers, breaks, shears, etc.

□□□ 2203 Remove and replace all external components on single function instruments such as control knobs, fuses, circuit breakers and meters.

□□□ 2204 Repair pan and patient scales.

□□□ 2205 Preventive maintenance as required, elements, tubing, gaskets, and glassware in water stills, auto-analyzers, constant temperature devices and dental units.

□□□ 2206 Remove and replace as required, elements, tubing, gasket and glassware in water stills, auto-analyzers, constant temp ature devices and dental units.

□□□ 2207 Preventive maintenance of steam valves, thermostats, heating elements and gaskets found on portable autoclaves and sterilizers.

□□□ 2208 Remove and replace steam valves, thermostats, heating elements and gaskets found on portable autoclaves and sterilizers.

□□□ 2209 Preventive maintenance of valves, regulators and seals on gas sterilizers.

□□□ 2210 Remove and replace valves, regulators and seals on gas sterilizers.

□□□ 2211 Preventive maintenance of respirator components such as oil-less pumps, valves, filters, pressure switches, gaskets, hoses, clamps and bellows.

□□□ 2212 Remove and replace respirator components such as oil-less pumps, valves, filters, pressure switches, gaskets, hoses, clamps and bellows.

□□□ 2213 Performance check respirator components such as oil-less pumps, valves, filters, pressure switches, gaskets, hoses, clamps and bellows.

L M S

□□□ 2214 Preventive maintenance of instrument refrigeration components such as start relays, condenser packs, coolant seals and thermostats.

□□□ 2215 Remove and replace instrument refrigeration components such as start relays, condenser packs, coolant seals and thermostats.

□□□ 2216 Repair instrument refrigeration components such as start relays, condenser packs, coolant seals and thermostats.

□□□ 2217 Works with fluid and gas fittings and tubing such as those found in respiration equipment and cooling and heating equipment, e.g., solders, swages, cuts, bends, etc.

□□□ 2301 Test thermostats such as those found in water baths, air warmers, etc.

□□□ 2302 Remove and replace components of pipette dryers, ultrasonic cleaners, etc.

□□□ 2303 Inspect line cord and line connectors for wear and damage on all medical equipment.

□□□ 2304 Remove and replace line cords and line connectors that are worn or damaged on all medical equipment.

□□□ 2401 Solders standard electrical and electronic components.

□□□ 2402 Repair equipment such as incubator ovens, heating and elements, bacterial water baths, tissue water baths, water and blood temperature regulators.

□□□ 2403 Performance check equipment such as incubator ovens, heating elements, bacterial water baths, tissue water baths, water and blood temperature regulators.

□□□ 2404 Repair heating elements and thermal controls of infant incubators.

□□□ 2405 Performance check heating elements and thermal controls of infant incubators.

□□□ 2406 Performance check patient electrode cables such as those used for ECG, external pacemakers, defibrillators, electro-surgical equipment and impedence pneumographs.

□□□ 2407 Remove and replace patient electrode cables such as those used for ECG, external pacemakers, defibrillators, electro-surgical equipment and impedence pneumographs.

□□□ 2408 Remove and replace visible and ultra-violet light sources in spectrometers.

□□□ 2409 Align visible and ultra-violet light sources in spectrometers.

□□□ 2410 Preventive maintenance of suction and circulating pumps of all types, including pump drive belts, regulators, filters and diaphragms.

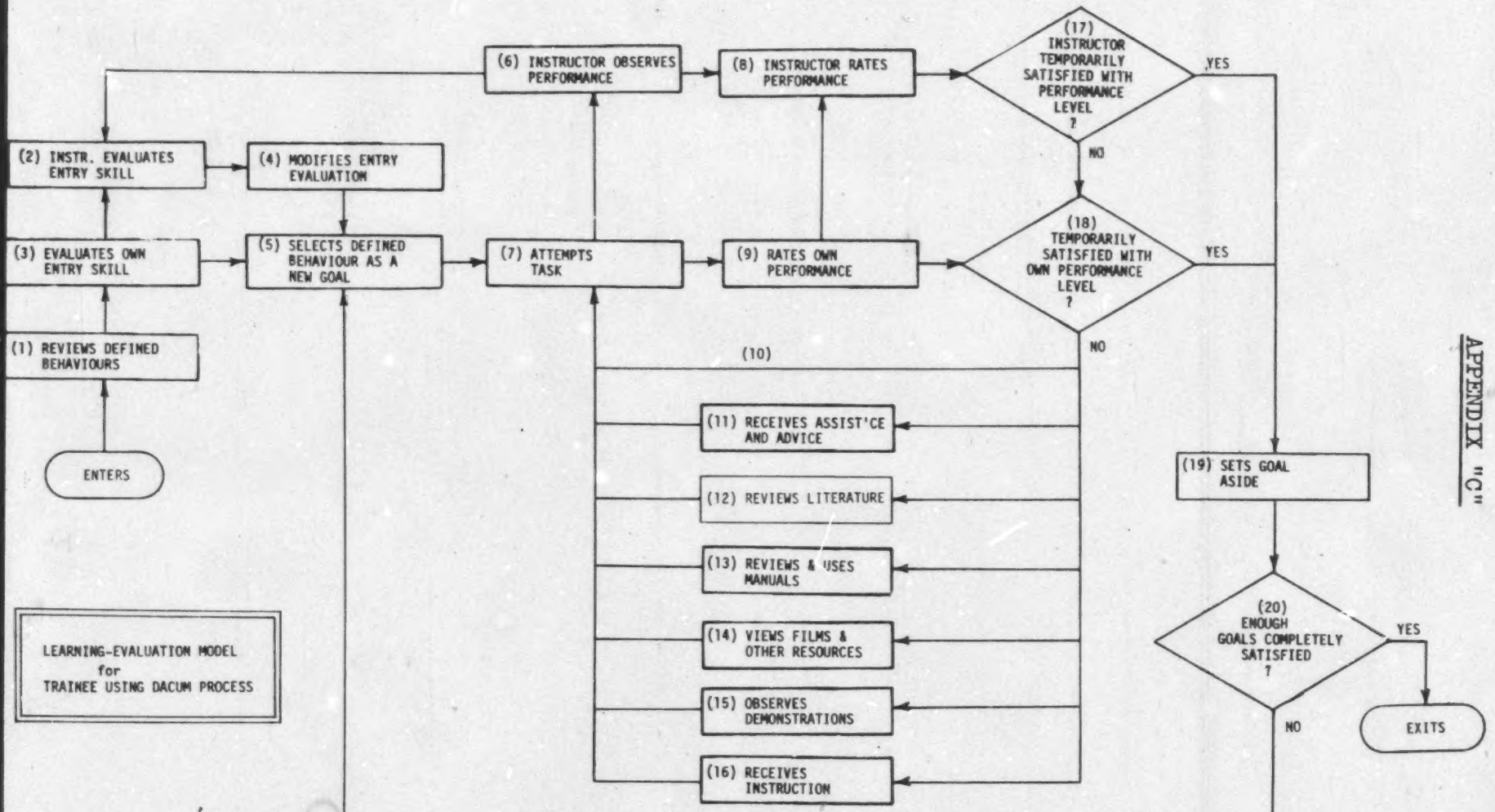
□□□ 2411 Repair suction and circulating pumps of all types including pump drive belts, regulators, filters and diaphragms.

□□□ 2412 Performance check suction and circulating pumps of all types including pump drive belts, regulators, filters, and diaphragms.

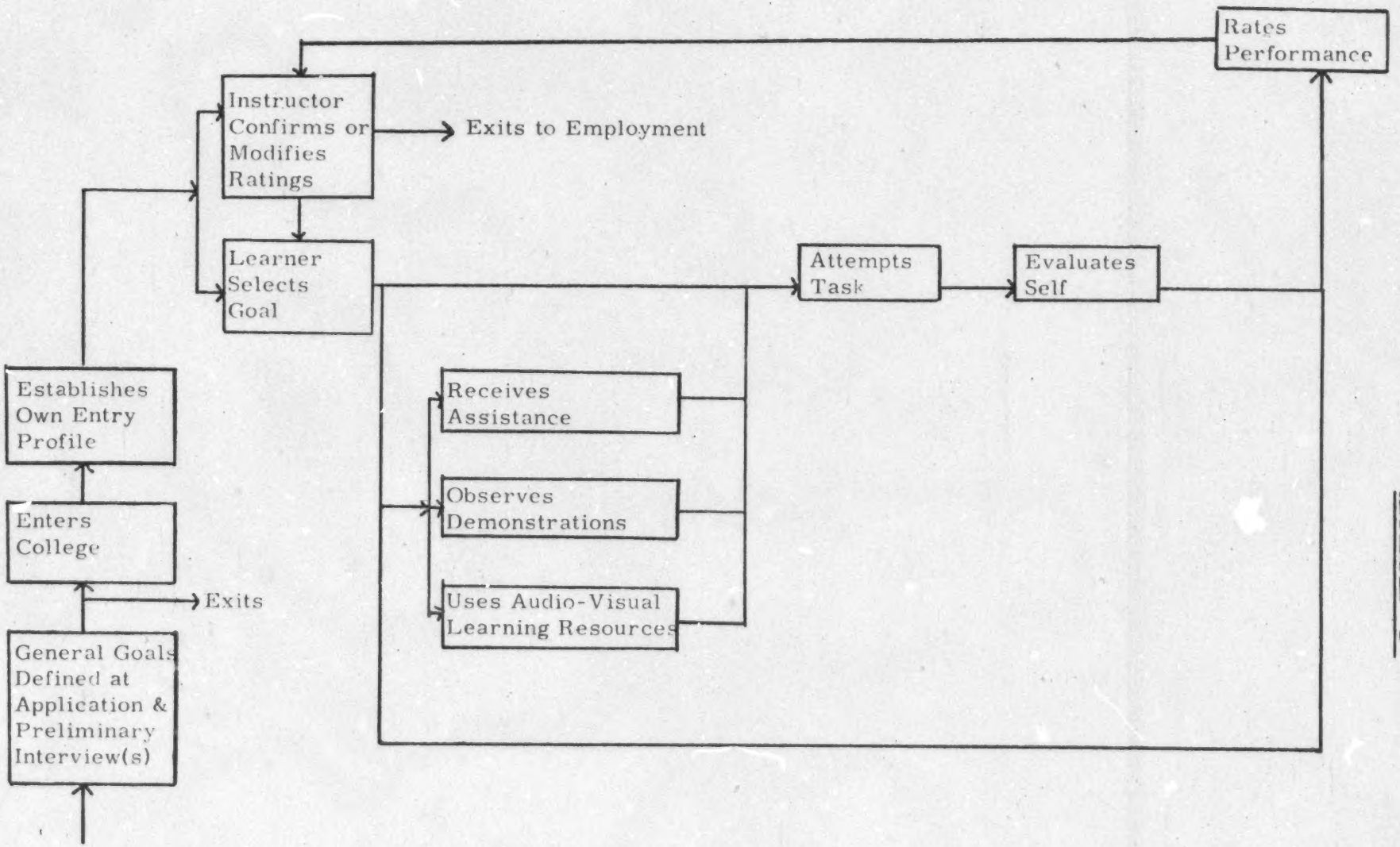
□□□ 2413 Preventive maintenance of clinical centrifuge and other small motor driven device components such as rotors, sample holders, motor brushes, motor bearings, drive couplings and shaft seals.

□□□ 2414 Remove and replace clinical centrifuge and other small motor driven device components such as rotors, sample holders, motor brushes, motor bearings, drive couplings and shaft seals.

□□□ 2415 Repair clinical centrifuge and other small motor driven

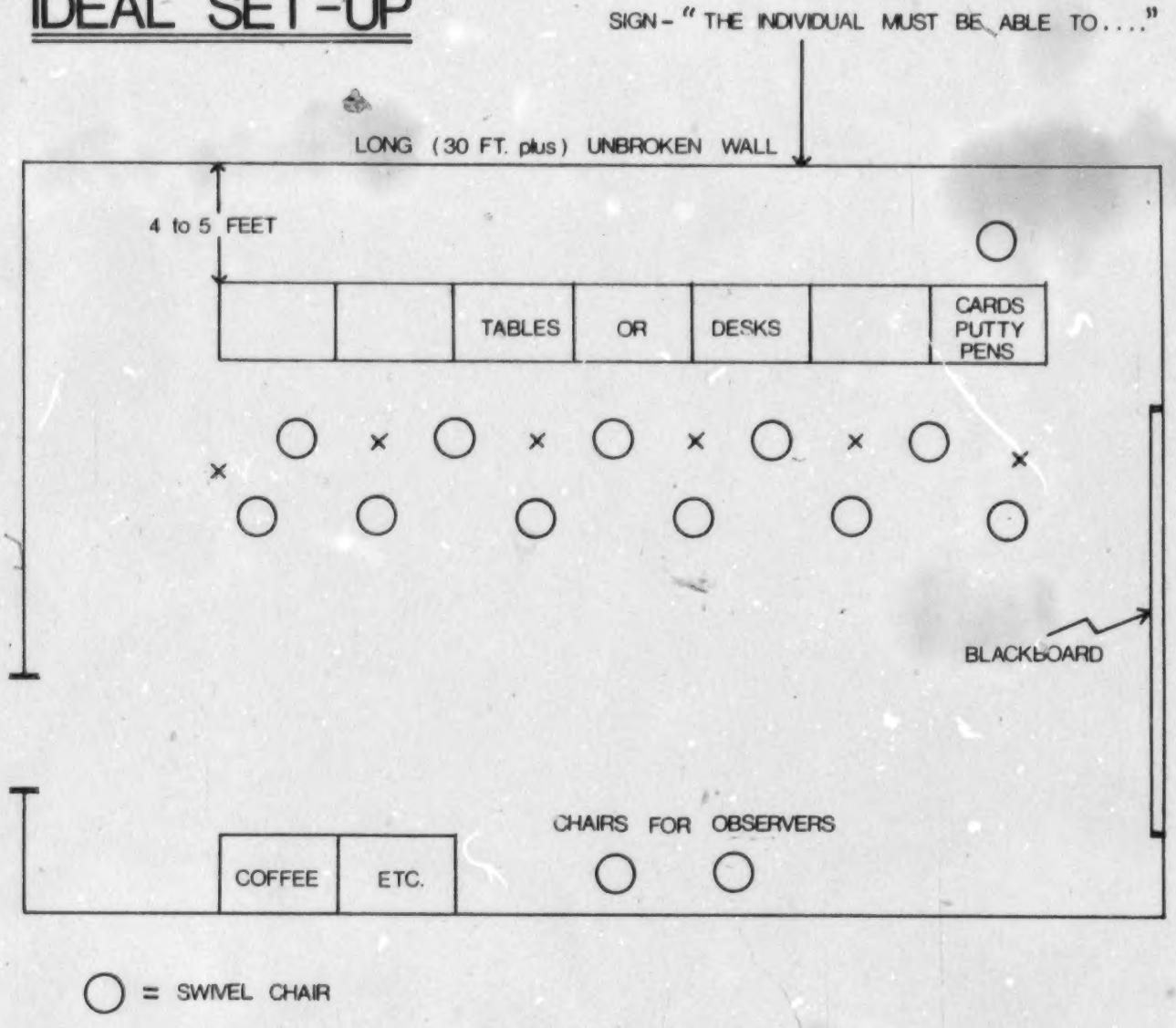

(6) INSTRUCTOR OBSERVES PERFORMANCE
(8) INSTRUCTOR RATES PERFORMANCE
(17) INSTRUCTOR TEMPORARILY SATISFIED WITH PERFORMANCE LEVEL ?
YES
NO
(2) INSTR. EVALUATES ENTRY SKILL
(4) MODIFIES ENTRY EVALUATION
(3) EVALUATES OWN ENTRY SKILL
(5) SELECTS DEFINED BEHAVIOUR AS A NEW GOAL
(7) ATTEMPTS TASK
(9) RATES OWN PERFORMANCE
(18) TEMPORARILY SATISFIED WITH OWN PERFORMANCE LEVEL ?
YES
NO
(1) REVIEWS DEFINED BEHAVIOURS
(10)
(11) RECEIVES ASSIST'CE AND ADVICE
(12) REVIEWS LITERATURE
(13) REVIEWS & USES MANUALS
(14) VIEWS FILMS & OTHER RESOURCES
(15) OBSERVES DEMONSTRATIONS
(16) RECEIVES INSTRUCTION
ENTERS
(19) SETS GOAL ASIDE
(20) ENOUGH GOALS COMPLETELY SATISFIED ?
YES
NO
EXITS
LEARNING-EVALUATION MODEL for TRAINEE USING DACUM PROCESS

APPENDIX "C"



STEP LEARNING PROCESS

APPENDIX "D"

DIAGRAM of FURNITURE ARRANGEMENTS for a DACUM SESSION

IDEAL SET-UP